



DRAFT Environmental Assessment/Assessment of Effect

June 2003



Wahweap Development Concept Plan

Glen Canyon National Recreation Area • Arizona • Utah



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Environmental Assessment Assessment of Effect

Wahweap Development Concept Plan

**Glen Canyon National Recreation
Arizona and Utah**

SUMMARY

The Glen Canyon National Recreation Area (NRA) encompasses more than 1.2 million acres of land and water in northeastern Arizona and southeastern Utah. The principal feature of the area is Lake Powell, which was formed by Glen Canyon Dam on the Colorado River. Glen Canyon NRA was established by enactment of Public Law 92-593 on October 27, 1972. The legislation defines the purposes of the recreation area to include the following: “. . . to provide for public outdoor recreation use and enjoyment . . . and to preserve, scenic, scientific, and historic features contributing to public enjoyment of the area.”

NEED FOR ACTION

The Development Concept Plan (DCP) for the Wahweap Marina area was prepared in 1998. The purpose and need for modifying the previous DCP derives from several considerations, including changes in legislation and unforeseen economic conditions that have had a significant impact on operations of the area. One of the key elements addressed in this DCP is employee housing. The DCP update would include a consideration of the amount of housing required to meet current and future needs as well as a decision on where housing would be located. A fundamental aspect of this analysis is a determination of how much housing would be provided within the NRA, and what would be provided at Page or another location outside of the NRA. The National Park Service Housing Management Handbook (NPS 1997) states: “it is the policy of the Service to provide only the minimum number of housing units necessary to support the mission of the NPS.”

ALTERNATIVES

This environmental assessment evaluates three alternatives. Alternative A (no-action) consists of a continuation of existing uses and facilities combined with those already under construction or identified in the 1998 DCP.

Alternative B combines a number of elements, which includes modifying concessioner housing, improving the layouts of dry boat storage and construction areas, upgrading the Stateline parking area, and a number of other facility upgrades and enhancements. A key feature of this alternative is the proposed removal of all mobile homes, trailers, and

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dormitories from the concessioner housing area. Remaining concessioner housing would be limited to 30 units needed for First Response personnel to meet operational needs for visitor services and to provide timely emergency response (24 hour) as needed.

Alternative C (the preferred alternative) includes many of the elements contained in alternative B. The most notable differences include a different concessioner housing program, relocating the dry boat storage area, providing additional food services, and separating visitor and employee use areas. The preferred action is based on a concept of dispersing use to two key activity nodes, the Stateline and Wahweap launch ramps, and the concentration of compatible land use activities. This concept was first mentioned in the 1983 DCP; however, a dispersal of visitors was never fully realized.

Based on the environmental analysis in this document, alternative C is considered the environmentally preferred alternative because it would best fulfill park responsibilities as trustee of sensitive resources; ensure safe, healthful, productive, and aesthetically and culturally pleasing surroundings; and attain a wider range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

ENVIRONMENTAL CONSEQUENCES

Impacts of the three alternatives were assessed in accordance with *Director's Order #12: Conservation Planning, Environmental Impact Analysis and Decision-Making*. The *Director's Order #12 Handbook* requires that impacts to park resources be analyzed in terms of their context, duration, and intensity. To determine impacts, methodologies were identified to measure the change in park resources that would occur with the implementation of the alternatives. Thresholds were established for each impact topic to help understand the severity and magnitude of changes in resource conditions, both adverse and beneficial.

The majority of predicted adverse impacts result from construction of new and enhanced facilities. These impacts are predicted to be short term and negligible to minor for all resources and impact topics except the soundscape. Due to the proximity of construction activities to visitor use areas, short-term soundscape impacts are predicted to be moderate. Construction-generated sound would include construction equipment, vehicles and building activities, which would occur intermittently during the four to six years of development.

Long-term impacts are also predicted to be negligible to minor for most resource types and impact topics. Exceptions to the negligible to minor rating occur on several impact topics, including soundscape, visitor experience, visual resources, and socioeconomics. Of these long-term impacts, impacts to the soundscape would be adverse and the remainder would be beneficial. Long-term adverse impacts to the soundscape are anticipated to range from minor to moderate and are associated with continued operation of new and existing facilities. For the preferred alternative (alternative C), this includes improvements to the Stateline launch ramp area in order to reduce congestion and redistribute marina users. This would result in a slight decrease in noise levels at the Wahweap Marina and an increase in noise levels at the Stateline launch ramp.

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Other long-term, moderate impacts are considered to be beneficial. Some of these beneficial impacts result from the removal of existing facilities and restoration of previously disturbed areas. In particular, removal of some existing housing units, the Lake Powell Motel, relocation of dry boat storage, and other actions would improve visual quality. These actions would also have minor beneficial impacts on other resources, such as vegetation, wildlife habitat and soils.

Long-term beneficial impacts would also result from proposed facility improvements. For both alternatives B and C, beneficial impacts to the visitor experience and park operations, public safety, and transportation and traffic are anticipated.

PUBLIC COMMENT

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. This environmental assessment will be on public review for 30 days. Please note that names and addresses of people who comment become part of the public record. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

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1.0 Purpose and Need

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1.0 PURPOSE AND NEED

1.1 INTRODUCTION

The Glen Canyon National Recreation Area (NRA) encompasses more than 1.2 million acres of land and water in northeastern Arizona and southeastern Utah. The principal feature of the area is Lake Powell, which was formed by Glen Canyon Dam on the Colorado River. Glen Canyon NRA was established by enactment of Public Law 92-593 on October 27, 1972. The legislation defines the purposes of the recreation area to include the following: “. . . to provide for public outdoor recreation use and enjoyment . . . and to preserve, scenic, scientific, and historic features contributing to public enjoyment of the area.”



Administered by the National Park Service (NPS), the purpose of the Glen Canyon NRA, as established in the General Management Plan (NPS 1979) is “...To provide for public outdoor recreation use and enjoyment...and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area.” The Glen Canyon NRA provides boating, fishing, hiking and camping opportunities to more than two million people a year. As shown in figure 1-1, recreational activities and development are concentrated at six permanently developed marinas: Wahweap, Dangling Rope, Bullfrog Basin, Halls Crossing and Hite (Antelope Point is under development). Wahweap Marina, located near Glen Canyon Dam and the City of Page, is the largest of the six areas (figure 1-2).

To implement development within the recreation area, the NPS uses Development Concept Plans (DCP) that build on the general goals and objectives set forth in the general management plan. To date, two development concept plans have been published, one in 1983 and one in 1998. When finalized, this document will replace the 1998 Wahweap Development Concept Plan. The plan will guide future development of facilities and infrastructure in the Wahweap area for the next 15-20 years. An environmental assessment (EA) has been prepared in tandem with this planning document to analyze the proposed action and alternatives and their impact on the environment. The EA has been prepared in accordance with the National Policy Act (NEPA) of 1969, the National Historic Preservation Act (NHPA) and regulations of the Council of Environmental Quality (40 CFR 1508.9).

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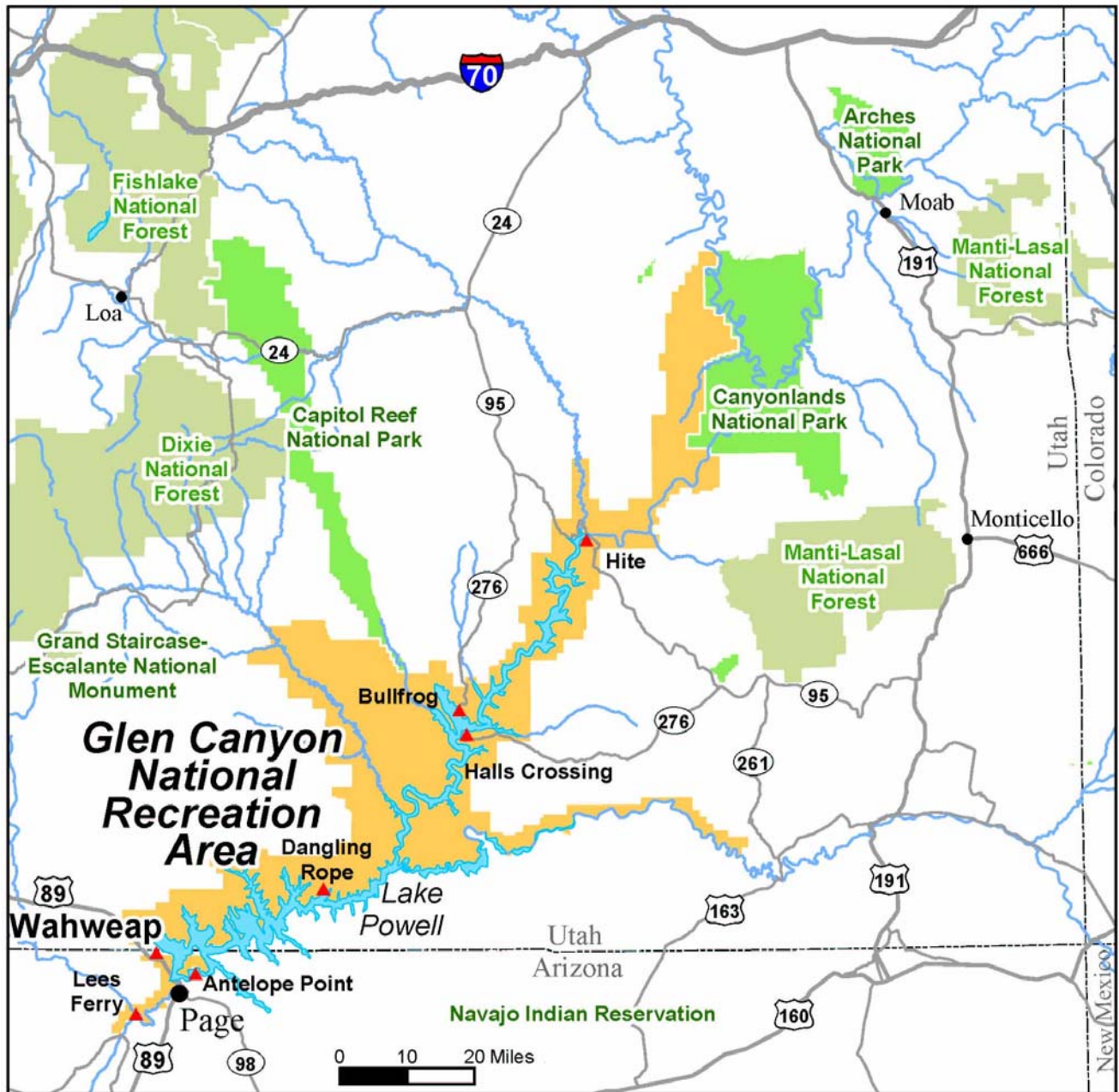


Figure 1-1 Regional Location of Glen Canyon National Recreation Area

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1-2

Glen Canyon National Recreation Area

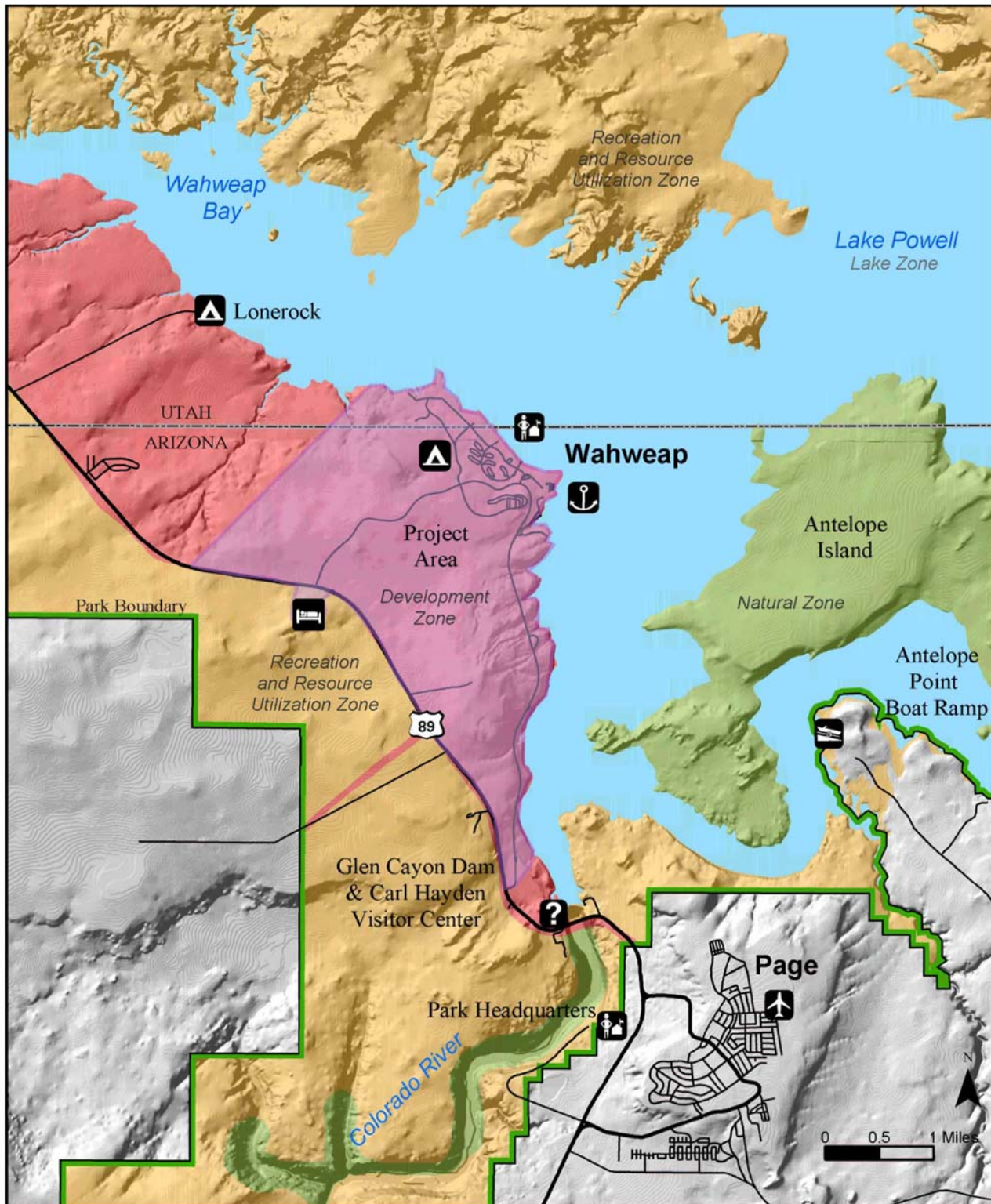


Figure 1-2 Glen Canyon National Recreation Area Management Zones

1.2 PURPOSE AND NEED FOR ACTION

The Glen Canyon NRA is an important recreational resource. Its significance includes:

- Glen Canyon NRA offers a tremendous diversity of both water and land-based recreational opportunities.
- Glen Canyon NRA contains Lake Powell, the second largest man-made lake in North America, which provides both a unique opportunity to recreate in a natural environment and a transportation corridor to remote back-county areas of Glen Canyon NRA.
- Glen Canyon NRA, in the heart of the Colorado Plateau region, offers a unique combination of water and desert environment. It offers a natural diversity of rugged water and wind carved canyons, buttes, mesas, and other outstanding physiographic features.
- The climate and physical features of Glen Canyon NRA have created local environments favorable to the preservation of scientifically important objects, sites, populations, habitats, or communities that are significant in and of themselves; or provided opportunities to add to our understanding of past or ongoing events.
- Evidence of 10,000 years of human occupation and use of resources within Glen Canyon NRA provides a continuing story of prehistoric, historic, and present-day affiliation of humans and their environment.
- Glen Canyon NRA constitutes a significant part of the outstanding public lands in the Colorado Plateau.

The purpose of the Wahweap DCP is to implement the objectives of the Glen Canyon NRA General Management Plan (GMP). Some of the broad objectives of the GMP include:

- Manage the recreation areas so they provide maximum recreation enjoyment to the American public and their guests.
- Maximize the recreational experience and the number of opportunities for enjoying the recreation area.
- Provide the richest possible interpretive experience to visitors to the recreation area.
- Manage the recreation area within its legislatively imposed constraints.

Within this context, an updated DCP is being prepared that will enhance the ability of the Wahweap Marina Area to contribute to meeting overall NRA objectives, while also meeting identified facility and resource management needs.

The previous Development Concept Plan (DCP) for the Wahweap Marina area was prepared in 1998. The need for modifications to the previous DCP derives from several considerations, including changes in housing policy and recent visitor trends that have had a significant impact on operations of the area. One of the plan elements that has been affected by these changes is employee housing. The DCP update would address this important issue, including a determination of the amount of housing required to meet current and future needs as well as a decision on where housing would be located. A fundamental aspect of this analysis is a determination of how much housing would be provided within the NRA, and what would be provided at Page or another location outside of the NRA. The National Park Service Housing Management Handbook (NPS 1997) states: “it is the policy of the Service to provide only the minimum number of housing units necessary to support the mission of the NPS.”

Nine objectives were defined as part of the Wahweap DCP process. They include:

- Direct future development and activities in a manner that build upon the goals and objectives of the GMP.
- Preserve the quality of natural resources and recreational opportunities while not exceeding land development allowances and established lake carrying capacities.
- Identify concessioner’s commercial, operational, and maintenance needs.
- Respond to housing needs, guidance and legislation.
- Update management guidance based on existing conditions, visitation, user demand, patterns and needs.
- Evaluate the age, type and condition of existing facilities.
- Improve operational efficiency of services and facilities.
- Protect the landscape character and quality including key viewsheds.
- Integrate existing and proposed services with the local economy where appropriate.

1.3 RELATIONSHIP OF THE PROPOSED ACTION TO OTHER PLANNING EFFORTS

A variety of NPS, federal, and state plans, policies and actions influence management of the Wahweap area and development of the DCP. Selected plans and policies are summarized below, starting with the most general.

General Management Plan, 1979 . The Glen Canyon NRA is operating under the management goals and objectives set forth in the 1979 GMP. The Wahweap Marina

PURPOSE AND NEED

area is designated as a potential development site in the GMP, and any recreational development at Wahweap Marina would be consistent with and supported by the GMP.

The Carrying Capacity of Lake Powell: A Management Analysis of Capacity for Boater Recreation, 1987. This study defines the lake carrying capacity for each of 13 zones delineated at Glen Canyon NRA. Topics covered in this document include launch rate limitations to protect lake shoreline, water quality, and other limited resources.

Bureau of Reclamation Annual Reservoir Operations Plan. Section 602 of the Colorado River Basin Project Act requires the Bureau of Reclamation to prepare an operations plan each year. Glen Canyon Dam is managed primarily to meet statutory water delivery obligations, with consideration given to maintaining or improving instream flow for aquatic resources. The annual plan, which varies according to anticipated hydrologic conditions and other factors, would have a substantial influence on water levels at Lake Powell.

Personal Water Craft Environmental Impact Statement and Rule-Making, 2003. NPS is currently in the process of developing a decision and rule concerning the use of personal watercraft at Glen Canyon NRA. The proposed rule would allow personal watercraft use in the recreation area under a special regulation with additional management restrictions. Personal watercraft use would be restricted in certain areas and their numbers regulated.

Housing Management Handbook, 1997. Public Law 88-459, The Employee Quarters and Facilities Act, gives the NPS authority to provide housing for permanent and temporary workforce. Quality park housing is an essential management tool used to effectively and efficiently provide for the protection of park resource, property and visitors, and to meet the park's mission.

Development Concept Plan for Wahweap, 1983. Most of the proposed developments from this plan have been accomplished. This document was replaced by the 1998 DCP.

Wahweap Development Concept Plan, 1998. This document serves as development guidance for the Wahweap area until it is replaced by an approved plan update.

Antelope Point Marina and Resort Development Plan/Environmental Assessment, 2002. Implementation of this plan may effect visitation at Wahweap. The plan would add up to 300 boat slips, a marina, a hotel, and boat ramp at a location 3 miles southeast of the Wahweap Marina on Lake Powell.

Wahweap Concessioner Housing Master Plan Workshop Summary, 2001. A housing concept design and programming workshop was held in September, 2001. The meeting was used to help determine the future employee housing program for the area. Three alternative housing concepts were examined.

Wahweap Wastewater Management Upgrade/Environmental Assessment, 2002. The wastewater plan proposes to reclaim the sewage lagoons and transfer sewage to the City of Page wastewater treatment system. Since an EA was previously conducted, an analysis of implementing this action is not included in this document.

Wahweap Trailer Village Cabins, A Study to evaluate potential National Register Eligibility 2002. This study examines the eligibility of existing structures located within the Wahweap development area.

1.4 PUBLIC INVOLVEMENT

NEPA requires that agencies make a diligent effort to involve the interested and affected public before they make decisions affecting the environment. To help inform the public, a scoping brochure compiled by the NPS was sent out to a mailing list of 300 individuals known to have an interest in Lake Powell in general and in the Wahweap Marina area in particular. A copy of the scoping brochure and report are presented in appendix A.

The scoping brochure included a summary of the preliminary issues and a request to comment upon plan elements or issues of interest.



To better understand these public concerns and to gather additional input, a public scoping meeting was also held on January 22, 2003 at the Wahweap Lodge. During the scoping meetings, attendees were educated about existing conditions and participated in a vision, goals and issues exercise. Approximately 50 people attended the scoping meeting and supported the issues identified by the park. Concession employee housing availability and cost were a significant topic for the public participants. Another concern identified was the desire for on-site medical clinic.

An additional newsletter was sent in May, 2003 to approximately 1,500 slip and dry boat storage space holders describing the project and results to-date. A public open house was also held on May 14, 2003 at the Wahweap Lodge to obtain public comment on the three alternatives. A newsletter was sent to approximately 300 people, notifying them of the meeting. Comments from the over 40 attendees included the support for the removal of the Lake Powell Motel and a dedicated employee shuttle. More information about the public involvement process can be found in appendix A and chapter 5.

1.5 IMPACT TOPICS IDENTIFIED FOR ANALYSIS

Topics for analysis were identified based on workshops with NPS specialists, comments received during the scoping meeting, current management issues for the NRA, resource values, and impacts previously described in Wahweap DCP/EA (NPS 1998a). The topics analyzed in this assessment to identify the potential impacts of the project are listed below:

Geology and Soils. Glen Canyon NRA is in the Colorado River watershed of southeastern Utah, which is part of the larger Colorado Plateau system. Low-lying areas in the park were inundated by Lake Powell, leaving upland areas that generally consist of rock outcrops and thin soils. Because the proposed action involves ground disturbing activities, geology and soils would be addressed as an impact topic.

Air Quality. Section 118 of the 1963 Clean Air Act (42 U.S.C. 7401 *et seq.*) requires a park to meet all federal, state, and local air pollution standards. Glen Canyon NRA is designated a Class II air quality area under the Clean Air Act, as amended. A Class II area is defined as an area having moderate to good air quality. The Clean Air Act provides that the federal land manager has an affirmative responsibility to protect the park's air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts. Thus, air quality would be addressed as an impact topic in this document.

Water Quality. Lake Powell's importance as a resource and the number of recreational users on the lake require that water quality be continually monitored to ensure the standard is being met. The Clean Water Act and supporting criteria and standards promulgated by the EPA, Utah Department of Environmental Quality and the Arizona Department of Environmental Quality are used at Glen Canyon NRA. Although no alternatives contribute directly to water quality degradation, increased amenities could attract a greater number of visitors.

Vegetation. The shrub-grassland community in the Wahweap vicinity is characterized by blackbrush, shadscale, Indian ricegrass, and other cold desert species. The National Environmental Policy Act NEPA (1969) calls for an examination of the impacts on all components of affected ecosystems. National Park Service policy is to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and ecological integrity of plants and animals (National Park Service *Management Policies*, 2001). Therefore, vegetation communities would be addressed as an impact topic.

Visual Resources. The NPS strives to preserve and protect visual resources to ensure a quality visitor experience. Visual resource classes and policies have been outlined by the NPS in the GMP (NPS 1979) and NPS Management Policies 2001. All alternatives influence the visual quality and lighting of the immediate Wahweap area. Therefore, visual resources would be addressed as an impact topic.

Wildlife and Wildlife Habitat. The National Environmental Policy Act NEPA (1969) calls for an examination of the impacts on all components of affected ecosystems. National Park Service policy is to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and ecological integrity of plants and animals (National Park Service *Management Policies*, 2001). Therefore, wildlife habitat communities would be addressed as an impact topic.

Soundscape. The National Park Service Management Policies 2001 (section 4.9) requires the agency to preserve, to the greatest extent possible, the natural soundscapes of parks. Directors Order #47: Soundscape Preservation and Noise Management (NPS 2000), defines appropriate and inappropriate noise. Although most sound producing activities defined in the alternatives would be consistent with the enabling legislation, the extent of proposed construction activities warrants the evaluation of this topic.

Threatened, Endangered, Candidate Species and Species of Special Concern. The Endangered Species Act (1973) requires an examination of impacts on all federally-listed threatened or endangered species. National Park Service policy also requires examination of the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species. Although no effect to any federally listed species would be anticipated, there would be potential for sensitive species to occur in the NRA. For this reason, the impacts to sensitive species would be addressed.

Cultural Resources. The National Historic Preservation Act, as amended in 1992 (16 USC 470 *et seq.*), the National Environmental Policy Act, as well as the National Park Service's Director's Order-28, *Cultural Resource Management Guideline* (NPS 1996c), *Management Policies* (2001a), and Director's Order-12, *Conservation Planning, Environmental Impact Analysis and Decision-making* (NPS 2001b), require the consideration of impacts on cultural resources listed on or eligible for listing on the National Register of Historic Places. The undertakings described in this document are subject to Section 106 of the National Historic Preservation Act, under the terms of both the 1991 Programmatic Agreement among the National Park Service, the Advisory Council on Historic Preservation, the Arizona State Historic Preservation Officer, and the Utah State Historic Preservation Officer and the 1995 Service-wide Programmatic Agreement (NPS 1995b) among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. This document would be submitted to the Arizona State Historic Preservation Officer (SHPO) for review and comment.

The project area includes the Wahweap Trailer Village Cabins that have been determined eligible for the National Register of Historic Places based on local significance. The project area has yet to be examined for cultural landscapes. Seven archeological sites, have also been identified within the study area.

PURPOSE AND NEED

Ethnographic resources are defined by the NPS as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (DO-28, *Cultural Resource Management Guideline*, 191) (NPS 1996c). Glen Canyon NRA has engaged in early and extensive consultation with Native American groups for this project.

Therefore, cultural resources would be addressed as an impact topic in this document.

Visitor Use and Experience. The NRA receives more than 2 million visitors per year, with peak visitation occurring during the months of June, July, and August. Visitation to the Wahweap area exhibits a similar seasonal distribution and is estimated to total approximately 1.4 to 1.8 million visitors per year. Because facility expansion and upgrades are directed at improving visitor use and experience, the topic of visitor use and experience would be addressed as an impact topic.

Socioeconomic Environment. Activities associated with the alternatives relating to housing, improvements and operations could directly affect the cost to employees for housing and the demand for these services in adjacent communities. Thus, the socioeconomic environment would be addressed as an impact topic.

Park Operations. Park operations would be influenced by future development and visitation. Therefore, park operations would be addressed as an impact topic

Public Safety. National Park Service Management Policies 2001 state that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. Further, the NPS will strive to protect human life and provide for injury-free visits (NPS Management Policies 2001, section 8.2.5). Based on the potential to increase visitors to the Wahweap area, this topic would be evaluated.

Transportation. National Park Service Management Policies 2001 (section 9.2) establish guidelines for development, operation and maintenance of roadways and trails on NPS-managed lands. Based on the potential to increase visitors to the Wahweap area, this topic would be evaluated.



Impairment of Park Resources or Values.

In addition to determining the environmental consequences of the preferred and other alternatives, NPS policy (*Management Policies, 2001*) requires analysis of potential effects to determine whether or not actions would impair park resources.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities

Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. However, the laws do give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. An impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. A determination on impairment is made in chapter 3, in the *Environmental Consequences* section for the previously listed impact topics.

1.6 IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

Topics potentially affected by the project were identified during scoping and by NPS specialists. The impact topics were identified on the basis of federal laws, regulations, and orders; NPS Management Policies 2001; and National Park Service staff's knowledge of resources. Through this process it was determined that a number of impact topics would not be affected by the proposed action or alternatives. The rationale for dismissing specific topics from further consideration is given below.

Prime and Unique Farmland: In August, 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resource Conservation Service as prime or unique. Prime or unique farmland is defined as soil, which particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. The soils in the project area are not considered to be prime or unique farmlands.

PURPOSE AND NEED

Thus, the topic of prime and unique farmland would not be addressed as an impact topic.

Wetlands and Floodplains. Executive Order 11990, *Protection of Wetlands*, requires federal agencies to avoid, where possible, impacts on wetlands. Proposed actions that have the potential to adversely impact wetlands would be addressed in a Statement of Findings. There are no jurisdictional wetlands within the project area. Therefore, wetlands were dismissed as an impact topic and a Statement Of Findings for wetlands would not be prepared.

Executive Order 11988, *Floodplain Management*, requires all federal agencies to avoid construction within the 100-year floodplain unless no other practical alternative exists. Certain construction within a 100-year floodplain requires preparation of a Statement Of Findings. Although the washes in the Wahweap area are subject to flash flooding, none of the alternatives would affect a defined 100-year floodplain. Therefore, floodplains were dismissed as an impact topic and a Statement Of Findings for floodplains would not be prepared.

Museum Collections. The Glen Canyon NRA museum collection comprises approximately 134,000 items ranging from historical objects and archives to biological specimens. All of these items are stored outside the project area.

Paleontology. Little is known about the paleontological resources of the park. Examination of the project area by park staff determined that there were no potentially resources of concern (National Park Service Contracted Researcher/Paleontologist, Gillette, pers., com., July 2003f). Therefore, paleontology was dismissed as an impact topic in this document.

2.0 Alternatives Considered

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2.0 ALTERNATIVES CONSIDERED



This chapter of the DCP/EA outlines three alternatives for development at Wahweap. Alternative A (no-action alternative) consists of existing and under construction developments as described in the approved 1998 DCP. Alternative B includes a combination of compatible elements that meet many of the planning objectives and minimizes the number of concessioner employee housing units within the area. Alternative C (the preferred alternative) was developed by selecting a combination of compatible elements derived during the

scoping process that accomplished the planning objectives described in chapter 1 and meets recent housing policy. The preferred action is based on the concept of dispersing use to two key activity nodes, the Stateline and Wahweap launch ramp areas.

Descriptions of alternatives A, B and C are based on preliminary analysis and design as described in the remainder of this chapter and appendix B. If an action alternative were selected, further design would begin after appropriate concession contractual agreements are in place. This chapter also includes a description of alternatives considered but dismissed (section 2.4), a comparison of the components and the impacts for each alternative (section 2.5), and a rationale for the environmentally preferred alternative (section 2.5).

2.1 ALTERNATIVE A (NO-ACTION ALTERNATIVE)

The no-action alternative would allow the continuation of current uses and implement actions under construction from the 1998 DCP. Actions under construction include the expansion of the existing campground, relocating visitor RV sites, the construction of new fire station and extension of boat ramps to meet low water conditions. Elements of this alternative are depicted on figure 2-1 and are described in table 2-1. A comparison of alternatives can be found in section 2.6.

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Figure 2.1 – Alternative A

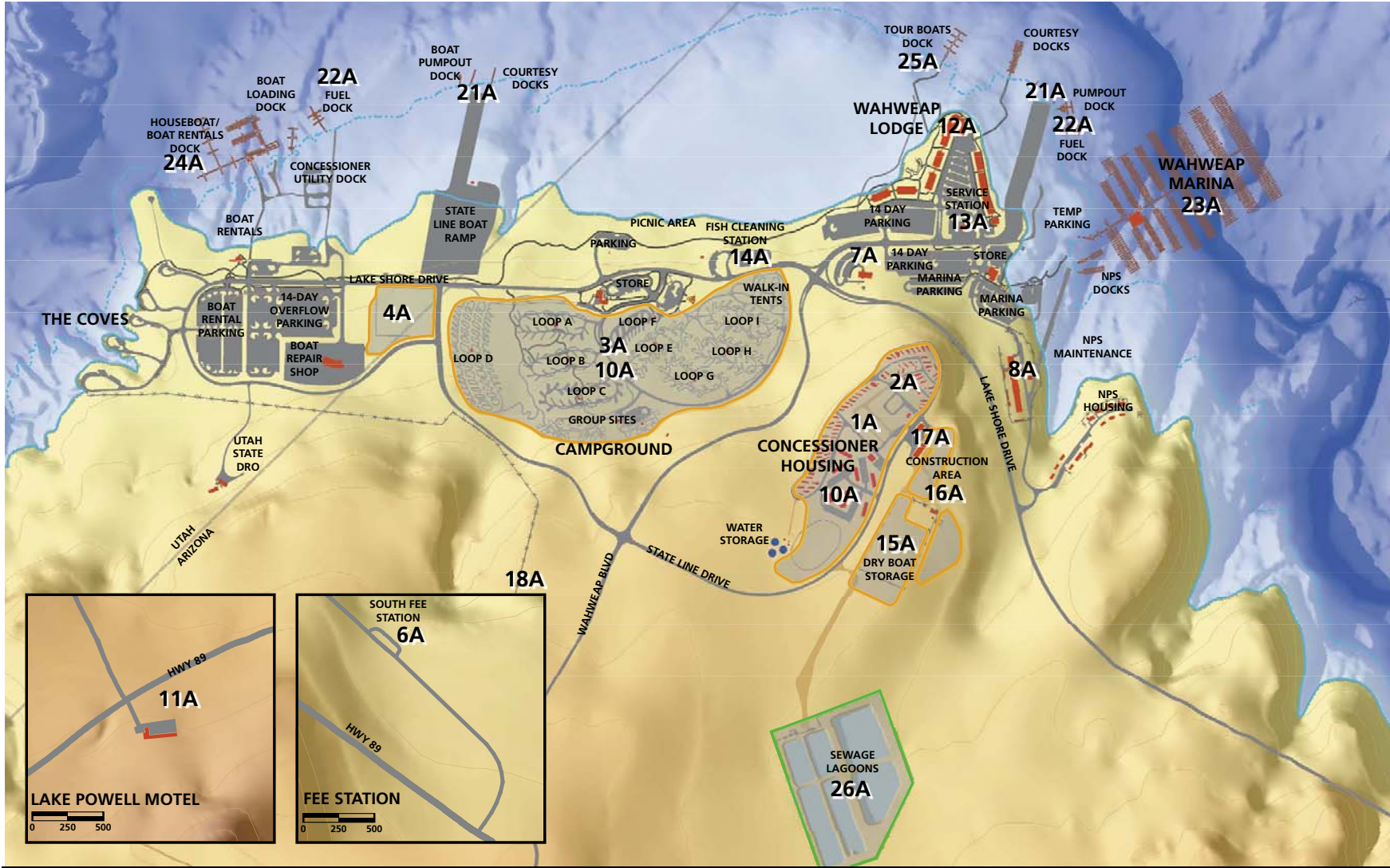


Figure 2.1
Alternative A
(No Action - Current DCP)

- LEGEND**
- Development Area
 - Rehabilitation Area
 - Historic Preservation
 - Buildings
 - Fence
 - High Shoreline (Elev 3700)
 - Low Shoreline (Elev 3610)
 - 40 Ft. Contours
 - Planned Roads and Walks

AREAS NOT SHOWN:
5A-Visitor Contact Station
(Not proposed in 1998 DCP)
9A-Bicycle Trail
(Along Lake Shore Drive)
19A-Food Service Facility (Not
proposed in 1998 DCP)
20A-Transfer Station
(Not proposed in 1998 DCP)

Note: Areas are subject to change
upon further review

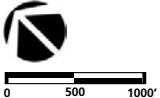


Table 2-1 - No-Action Elements		
#	Element	Description
Housing		
A.1	Concessioner Housing	The current housing supply and support facilities would remain at Wahweap, providing housing for the majority of the concessioner employees. Existing housing stock includes dorms (120 employees), RV units (50 employees), cabins (10 employees) and trailers (25 employees).
A.2	Cabins	Seven cabins, known as the Wahweap Trail Village Cabins, are considered eligible for listing on the National Register of Historic Places (National Park Service, 2003, Determination of Eligibility, Wahweap Trailer Village Cabins). The structures are currently being used as housing for concessioner employees. Under this alternative, no changes in use or condition of these structures would occur, except for any actions needed to comply with applicable building codes.
Land Facilities / Actions		
A.3	Campground	In 2002, work began to enhance the campground area to reflect a new set of goals and program based on the Wahweap Campground Master Plan, 1998. Much of this work has begun or is completed, including loops A, B, C and F; the amphitheatre parking; and six group sites. Included in the project is a new convenience/retail store with campground host/office, showers and laundry at the west entry into the campground.
A.4	Launch Ramp Parking	No additional launch ramp parking facilities would be constructed as part of this alternative.
A.5	Visitor Contact Station	A visitor contact station would not be provided, except for services currently available at the District Ranger's Office.
A.6	Fee Station	The North and South entrance fee stations would remain in their current condition.
A.7	Fire Station	Construction of a new fire station began in 2003 and will be built adjacent to the District Ranger's Office (DRO).
A.8	NPS Maintenance Area	No change to the National Park Service (NPS) maintenance area would occur.
A.9	Bicycle Trail	A bicycle trail to Page would not be provided.
A.10	Recreation Vehicle Park	The portion of visitor RV park (120 sites) is currently being relocated from the concessioner housing area to the campground area.
A.11	Lake Powell Motel	The 25-room Lake Powell Motel, is located on Highway 89 near the North entrance to the NRA. The facility would be maintained in its current use.
A.12	Wahweap Lodge	The existing 350-room Wahweap Lodge would maintain its current guest room capacity.
A.13	Service Station	The service station would remain in its current location with no change in use.
A.14	Fish Cleaning Station	The fish cleaning station would remain in its current location with no changes to the facilities or uses.
A.15	Dry Boat Storage	The dry boat storage area would remain in its current location, providing storage for up to 405 boats.
A.16	Construction Area	The construction area would remain in its current location.
A.17	Commercial Laundry Facility	The concessioner housekeeping/laundry facility would remain in its existing location.
A.18	NPS Storage Yard	The NPS storage yard would remain in its current location and configuration with no change in use.
A.19	Food Service Facility	Food services are currently being supplied at the Wahweap Lodge, the marina and campground stores. No additional food services would be planned as part of this alternative.
A.20	Recycling Transfer Station	A recycling transfer station would not be developed.
Water-Based Facilities		
A.21	Boat Ramps	Wahweap area would continue to be served by two public boat ramps, Wahweap and Stateline. These ramps would be improved to address low water conditions.
A.22	Docks	Several docks serve the Wahweap area. No changes to these facilities would occur.
A.23	Marina	The primary marina services are provided at Wahweap Marina. Wet storage allocation would remain at a total of 860 slips, 6 executive slips, mooring buoy capacity of 180, and 40 overnight slips at "H" dock.
A.24	Boat Rentals	Boat rentals would be maintained at the current limit of 325 (175 houseboats and 150 small boats). Personal watercraft (PWC) rentals will remain at 35 as per the Personal Watercraft Rule-Making Environmental Impact Statement.
A.25	Tour Boats	No changes would be planned to existing operations.
Other Facilities		
A.26	Wastewater Management Upgrade	As outlined in the Wahweap Wastewater Management Upgrade/ Environmental Assessment, 2002, the sewage lagoons will be reclaimed and waste transferred to the City of Page wastewater management system. Since an EA was previously conducted, an analysis of implementing this action is not included in this document.

ALTERNATIVES CONSIDERED

2.2 ALTERNATIVE B

Alternative B combines a number of compatible elements derived during project scoping. Proposed developments in this alternative include modifying concessioner housing, improving the layouts of dry boat storage and construction areas, and upgrading the Stateline parking area. Elements of this alternative are depicted on figure 2-2 and are described below. A comparison of alternatives can be found in section 2.6.

2.2.1 Housing

B.1 Concessioner Housing. The NPS Housing Management Handbook (NPS 1997) states: *it is the policy of the Service to provide only the minimum number of housing units necessary to support the mission of the NPS.* One of the principles of the housing policy is to first consider employee response time when evaluating the appropriateness of housing. To comply with this directive, all but 30 first response concessioner housing (category I) would be removed from Wahweap. First response personnel are considered those employees who meet operational needs for visitor services and provide timely emergency response (24 hour). Existing mobile homes, trailers and dormitories would be removed from the concessioner housing area. Displaced employees would have to find suitable housing outside the NRA in the neighboring communities. A shuttle system between those communities and Page and Wahweap would be instituted to facilitate employee travel.



B.2 Cabins. As described in the no-action alternative, there are seven cabins known as the Wahweap Trail Village Cabins located in the concessioner housing area. These structures are considered eligible for listing on the National Register of Historic Places and are being used for housing, but may not meet current building codes.



Working in collaboration with the Arizona State Historic Preservation Office, the Intermountain Regional Office, National Park Service, and the NRA, the appropriate level of mitigation and documentation would be determined prior to removal of the Wahweap Trail Village Cabins. Interpretive features describing the cabins would be placed on lodge grounds for public viewing. The area where the cabins were located would be rehabilitated with native vegetation.

Figure 2.2

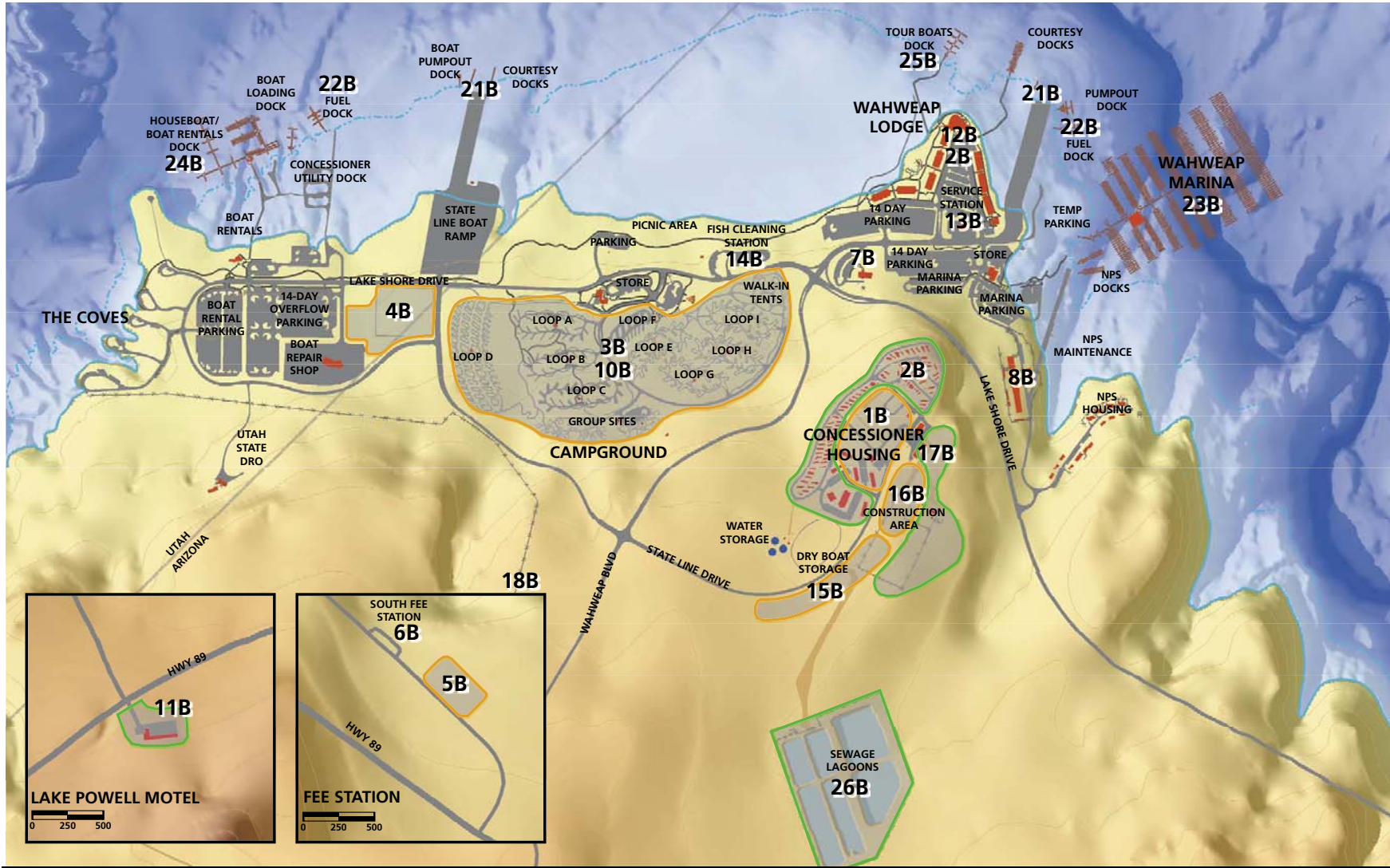


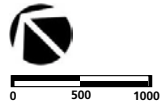
Figure 2.2
Alternative B

- LEGEND**
- Development Area
 - Rehabilitation Area
 - Historic Preservation
 - Buildings
 - Fence
 - High Shoreline (Elev 3700)
 - Low Shoreline (Elev 3610)
 - 40 Ft. Contours
 - Planned Roads and Walks

AREAS NOT SHOWN:

- 9B-Bicycle Trail (Along Lake Shore Drive)
- 19B-Food Service Facility (No additional facility proposed)
- 20B-Transfer Station (Facility located outside of park)

Note: Areas subject to change upon further review



2.2.2 Land Facilities / Actions

B.3 Campground. In 2002, work began to enhance the campground area to reflect a new set of goals and programs based on the Wahweap Campground Master Plan, 1998. As described in alternative A, much of this work is completed or has begun. The final phases of the project would include loops D and E; the amphitheatre remodel; loops G, H and I walk-in sites; and 9 group sites. Outdoor interpretive areas and wayside exhibits would also be constructed.

B.4 Launch Ramp Parking. Currently, there are two launch ramps at Wahweap – Stateline and Wahweap Lodge. Most visitors use the Wahweap ramp, which often creates traffic congestion. To help alleviate pressure on this launch ramp, parking facilities would be improved adjacent to the Stateline Launch Ramp. The current gravel parking area across from the ramp would be replaced with a paved parking area large enough to accommodate 365 car/trailer spaces.

B.5 Visitor Contact Station. A new visitor contact station would be constructed near the South entrance fee station. The facility would provide the first contact with visitors and provide information about the services, regulations, facilities and activities at Wahweap. The approximately 4 acre area would include a facility with a break room and restrooms for NPS employees working at the contact and fee stations. The visitor contact station would also be used to collect fees during the off-season. Interpretive displays and wayside exhibits would be developed at this facility.

B.6 Fee Station. No change to the North and South entrance fee stations would occur. Element B.5 describes new facilities that would support fee station operations.

B.7 Fire Station. As described in alternative A, construction of a new fire station began in 2003 and would be built adjacent to District Ranger's Office (DRO).

B.8 NPS Maintenance Area. The existing fire bay and lower warehouse in the NPS maintenance area would be renovated to accommodate the expansion of the adjacent water quality lab and to provide additional maintenance storage. Exterior storage areas would be reorganized for better efficiency and operational considerations (i.e., separate pedestrian and personal vehicle areas, equipment parking, three-sided storage enclosures, etc.). Additional screening would improve the visual quality of the area.

B.9 Bicycle Trail. A bicycle and pedestrian trail from Page to Wahweap would be constructed connecting Page to the NRA. The new trail, adjacent to Highway 89 and Lakeshore Drive, would provide alternative transportation options for visitors and employees located in the City of Page. The trail would connect to the City of Page's Rim Trail. The exact route of the trail has not been identified and would be subject to further design and environmental analysis. The new trail would be planned in conjunction with the city, Coconino County and Arizona Department of Transportation. Outdoor interpretive areas and wayside exhibits would be constructed along the route.

ALTERNATIVES CONSIDERED

B.10 Recreation Vehicle Park. As described in alternative A, the visitor RV park (120 sites) would be relocated from the concessioner housing area to the campground area, which helps separate employee and visitor use areas. As described in element B.1, no seasonal employee RV sites would remain in the concessioner housing area.



B.11 Lake Powell Motel. To consolidate lodging at Wahweap, this facility would be removed and the site rehabilitated with native vegetation.

B.12 Wahweap Lodge. The existing 350-room Wahweap Lodge maintains its current room allocation and operation. Existing meeting rooms would be renovated; the parking and drop-off area would be modified to improve circulation. The existing lodge building would also be renovated to meet current fire codes.

Interpretive displays and wayside exhibits would be developed at this facility.

B.13 Service Station. The existing service station near Wahweap Lodge would continue its primary use of providing fuel to visitors. The under-utilized mechanic bays in the same building would be modified to accommodate other commercial activities, such as a convenience store.

B.14 Fish Cleaning Station. The fish cleaning station would remain in its current location with no change in the facilities or use.

B.15 Dry Boat Storage. The dry boat storage area would remain in its general location. Highly visible from Lake Shore Drive, the facility's layout would be modified to reduce visibility, protect the ridgeline and improve the visual quality of the area. The facility would be relocated away from the ridgeline and along Stateline Drive. The authorized 450-boat storage facility would be screened and lighting upgraded for safety and to prevent excessive light pollution. Disturbed areas would be rehabilitated with natural vegetation.

B.16 Construction Area. Reduction of the concessioner housing (element B.1) and modification to the dry boat storage area (element B.15) would provide an opportunity to modify the construction area layout away from the ridgeline. The construction area layout would be modified to reduce visibility, consolidate activities, separate visitor and employee uses, enhance circulation and improve efficiency. Screening would be upgraded as well. The overall size of the facility would not change. Any disturbed areas would be rehabilitated to a natural state.

B.17 Commercial Laundry Facility. The concessioner housekeeping/laundry facility would remain in its existing location. In order to meet objectives outlined in chapter 1, future expansion would require the entire operation to be relocated outside the Glen Canyon NRA. If relocated, the building would be reused with a function to be determined.

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B.18 NPS Storage Yard. The NPS storage yard would remain in its current location and configuration. Internal and external screening would be added to improve the visual quality of the area.

B.19 Food Service Facility. As discussed in alternative A, food services are currently being supplied at the Wahweap Lodge, the marina and campground stores. Aside from the expansion of the marina store, no additional food services would be provided as part of this alternative.

B.20. Recycling Transfer Station. As discussed in the Integrated Solid Waste Alternative Program Plan (D. A. Kahl Consulting, 1999) for Glen Canyon National Recreation Area, there is a need for a recycling transfer facility in the area. NPS would work with a local commercial provider to evaluate the feasibility of locating a recycling transfer station outside the NRA.

2.2.3 Water-Based Facilities

B.21 Boat Ramps. The Wahweap area would continue to be served by two public boat ramps, Wahweap and Stateline. Low lake levels have necessitated improvements to these boat ramps to support boating conditions during periods of low water.



B.22 Docks. The Wahweap fuel dock would be expanded and upgraded to improve safety and provide secondary containment. The fuel dock at Stateline would be maintained at its current size, but upgraded to improve safety and provide secondary containment.

B.23 Marina. The Wahweap Marina would remain the only marina serving Wahweap. Wet storage allocation would remain at:

- a total of 870 slips
- mooring buoy capacity of 180
- overnight slips would be increased from 40 to 90, which includes replacing “H” dock and a combination of slip-docks and overnight slips.
- 40 new slips would be added for administrative, executive or commercial uses.
- total allocation of slips, end-tie and buoy numbers on the marina would be 1,180.

The marina store would be renovated or expanded to include office space and additional food service facilities. The service shop and executive service operation and the marina would be maintained. The electrical system is also currently being upgraded to improve efficiency

B.24 Boat Rentals. As described in alternative A, boat rentals would be maintained at the current limit of 325 (175 houseboats and 150 small boats) and PWC rentals would be limited to 35.

ALTERNATIVES CONSIDERED

B.25 Tour Boats. The concessioner would be limited to 12 tour boats (maximum of 149 passengers each), and would upgrade the existing fleet and facilities to provide accessible accommodations. This allocation would be a reduction from the currently authorized fleet of 20, but is an increase of 3 boats over the existing fleet of 9. New technology would be incorporated into new and replacement vessels to reduce wake and improve energy efficiency. The operation would ensure that accessible tour boat accommodations were offered.

B.26 Wastewater Treatment. The Wahweap Wastewater Management Upgrade/Environmental Assessment, 2002, was completed to reclaim the sewage lagoons and transfer sewage to the City of Page wastewater treatment system.

2.3 ALTERNATIVE C (PREFERRED ALTERNATIVE)

Alternative C (the preferred alternative) combines compatible elements derived during the scoping process that accomplished the planning objectives described in chapter 1. Many elements of this alternative are the same as alternative B. The most notable differences include a different concessioner housing program, relocating the dry boat storage area, providing additional food services and the creation of a new shuttle system. The preferred action is also based on a concept of dispersing use between two key activity nodes, the Stateline and Wahweap launch ramps, and the concentration of compatible land use activities. This concept was first mentioned in the 1983 DCP; however a dispersal of visitors was never fully realized. Elements of this alternative are depicted on figure 2-3 and described below. A comparison of alternatives can be found in section 2.6.

2.3.1 Housing

C.1 Concessioner Housing. The National Park Service Housing Management Handbook, 1997 states: *it is the policy of the Service to provide only the minimum number of housing units necessary to support the mission of the NPS.* Two categories of housing are considered important to remain on the NRA. Category I are those housing units designated for employees whose physical presence is required within a specific geographic area in the park to provide timely response to emergencies (first response employees). Category II are those housing units justified based on direct mission-related functions, including remoteness and temporary work force needs. The Housing Needs Assessment for Glen Canyon NRA (NPS 1999) supports the inclusion of category II housing by noting the inadequate supply of rentals available for year-round, term and seasonal employees.

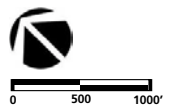
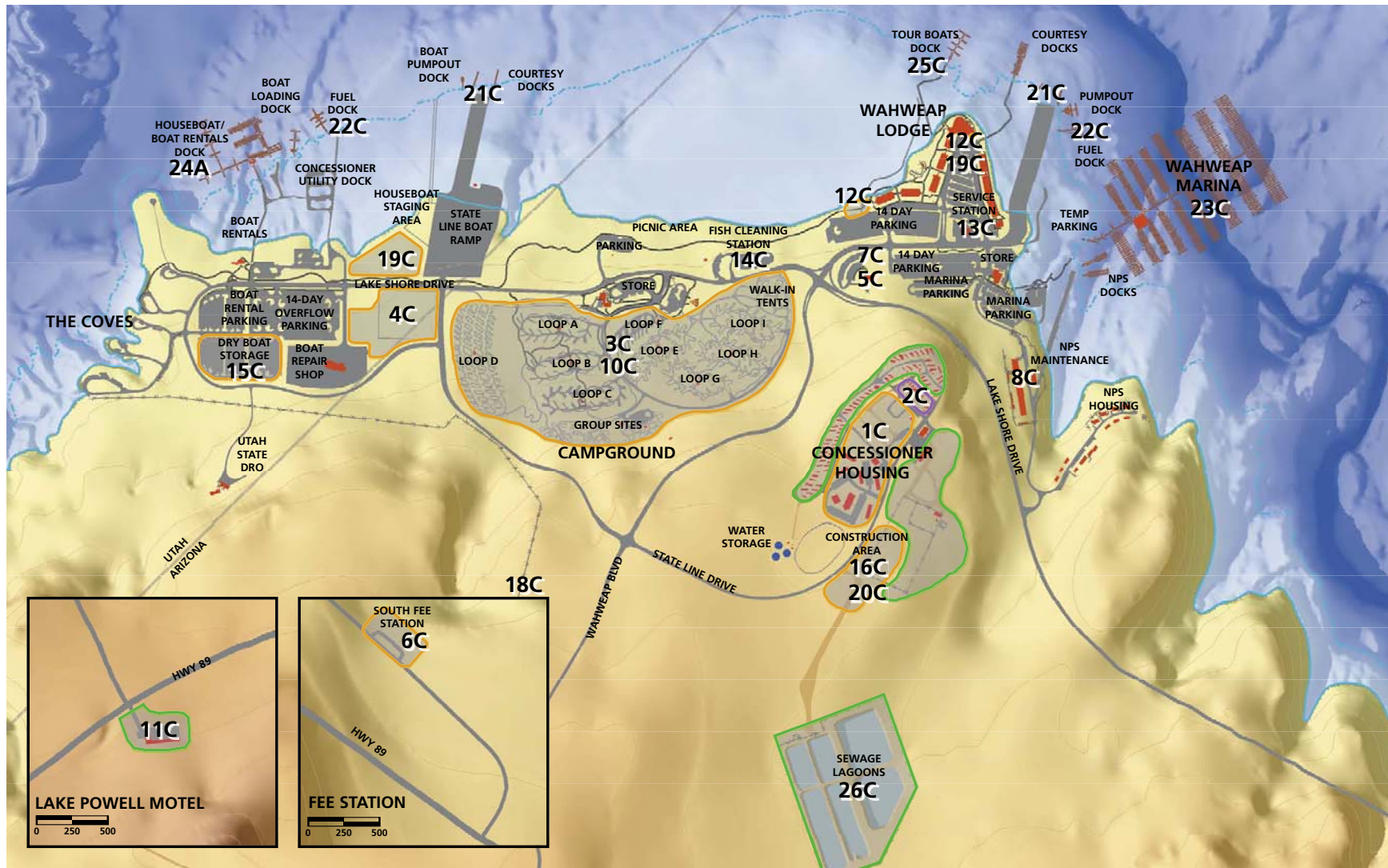
To comply with this directive, only First Response Housing (category I) and Seasonal Concessioner Housing (category II) would be provided. Based on this directive, housing would be provided for a maximum of 205 employees (175 seasonal, 30 first response). Since the overall housing amount is reduced, some employees would be required to find suitable housing outside of Glen Canyon NRA in neighboring communities.

Figure 2.3

LEGEND

- Development Area
- Rehabilitation Area
- Historic Preservation
- Buildings
- Fence
- High Shoreline (Elev 3700)
- Low Shoreline (Elev 3610)
- 40 Ft. Corridor
- Planned Roads and Walks

Note: Areas subject to change upon further review



To further define the concessioner housing area, a series of objectives were developed from several workshops. These include:

- protect viewshed/ridgelines
- provide housing flexibility
- minimized disturbed areas
- enhance aesthetic quality
- define development zones
- define preservation zones
- preserve visitor experience
- provide essential and seasonal housing
- provide support facilities
- preserve cultural resources

A housing concept was developed to accomplish these goals. Based on several zones, the housing plan would provide flexibility and direction for key areas. The zones are described below:

Preservation Zone. The preservation zone (figure A1.15) would remain free of structures (unless culturally significant) and preserve important natural and cultural areas. This zone would protect the prominent ridgeline from development, improving the visual quality of the NRA. The existing seven cabins, eligible for the National Register of Historic Places, are located within the preservation zone, creating an appropriate setting to protect these resources.

Development Zone. The development zone (figure A1.15), defines an appropriate area for housing in existing disturbed areas away from the prominent ridgeline. A series of visibility zones, described in appendices B and E, define appropriate building heights within this area. A future housing master plan would provide direction on recommended densities and architectural guidelines. Architectural guidelines would describe the general housing themes, types, color, materials and textures. The existing concessioner employee dormitories, mobile homes, trailers and cabins, including the privately-owned mobile homes/trailers, would be phased out (removed). Mobile homes, trailers and dorms could be replaced with a limited number of quality dormitories, fourplexes, duplexes, hook-ups and single family type housing. The development zone would also include a cafeteria, employee laundry, store, recreation room and outdoor recreation facilities (basketball, volleyball, etc.). Electrical, water and sanitary sewer upgrades would be incorporated into any new development. In addition, electrical feeders would be relocated underground.

C.2 Cabins. As described in the no-action alternative, there are seven cabins (Wahweap Trail Village Cabins) located in the concessioner housing area. These structures are considered eligible for listing on the National Register of Historic Places. They are being used for housing, but may not meet current building codes. Under this alternative, all the cabins would be retained and stabilized. As described in element C.1, the cabins are located in the Preservation Zone of the concessioner housing area, surrounded by land relatively free of development. The surrounding area would be used as open space, natural areas and parkland.

2.3.2 Land Facilities / Actions

C.3 Campground. As described in alternative B, the final phases of the project would include loops D and E; the amphitheatre remodel; loops G, H and I walk-in sites; and 9 group sites. The final campground would provide a total of 283 sites (191 hook-ups, 59 non hook-ups, 18 walk-in tent, and 15 group sites). Outdoor interpretive areas and wayside exhibits would also be constructed.

C.4 Launch Ramp Parking. As described in alternative B, there are two launch ramps at Wahweap, Stateline and Wahweap Lodge. Most visitors use the Wahweap Launch Ramp, often creating traffic congestion. To alleviate pressure in this area, additional improvements would be made in the Stateline area to encourage visitors to use the area. Part of these improvements would include replacing the current gravel parking area across from the ramp with an asphalt parking area large enough to accommodate 365 car/trailer spaces. This parking area, first mentioned in the 1983 DCP, would help alleviate the single car parking shortage near the Wahweap Marina. Since facilities in this alternative would be concentrated at two distinct activity nodes (Stateline and Wahweap), a new shuttle will facilitate movement between these two centers during peak periods. Parking barriers along the roads would be constructed to discourage informal parking.

C.5 Visitor Contact Station. The District Ranger's Office (DRO) would be renovated and/or expanded to include a new visitor contact station. This centralized facility would provide information about the services, regulations, facilities and activities at Wahweap. Interpretive displays and wayside exhibits would be developed at this facility.

C.6 Fee Station. The existing fee station booths at the South and North entrances were originally constructed as temporary structures. The existing facilities would be removed and replaced with larger booths and storage areas, upgraded HVAC, shade protection, restrooms and an employee break area.

C.7 Fire Station. As described in alternatives A and B, construction of a new fire station began in 2003 and will be built adjacent to the District Ranger's Office (DRO).

C.8 NPS Maintenance Area. As described in alternative B, the existing fire bay and lower warehouse in the NPS maintenance area would be renovated to accommodate the expansion of the adjacent water quality lab and provide additional maintenance storage. Additional equipment and NPS boat storage would be accommodated in a storage yard adjacent to the NPS maintenance yard. Exterior storage areas would be reorganized for better efficiency and operational considerations (i.e., separate pedestrian and personal vehicle areas, equipment parking, three-sided storage enclosures, etc.). Additional screening would improve the visual quality of the area.

C.9 Bicycle Trail. As described in alternative B, a bicycle and pedestrian trail from Page to Wahweap would be constructed, connecting Page with the Wahweap area. The exact route of the trail has not been identified and would be subject to further design and environmental analysis. The new trail would be planned in conjunction with the city, Coconino County and

Arizona Department of Transportation. Outdoor interpretive areas and wayside exhibits would be constructed along the route.

C.10 Recreation Vehicle Park. As described in alternative A, the visitor RV park (120 sites) would be relocated from the concessioner housing area to the lower campground area. Relocating the RV park would help separate employee and visitor use areas.

C.11 Lake Powell Motel. As described in alternative B, this facility would be removed and the site rehabilitated with native vegetation. To maintain the currently authorized number of lodging units at Wahweap, additional units could be constructed at Wahweap Lodge (see element C.12).

C.12 Wahweap Lodge. The existing 350-room Wahweap Lodge maintains its current use and would be expanded to accommodate new meeting rooms and maintain the currently authorized number of lodging units (see C.11). The southern portion of the main lodge would be expanded to provide additional meeting rooms for a maximum of 200 people. An additional feasibility study would be necessary to determine the exact size and composition of these facilities. An additional Wahweap Lodge building would be constructed adjacent to the northern unit, accommodating 25 additional guest rooms. Only limited expansion would be considered to avoid increasing traffic congestion and competing with commercial businesses in neighboring communities. The existing lodge building would also be renovated to meet current fire codes. Increasing use in this area would make it necessary to modify the layout of the parking and drop-off areas to improve circulation and ensure adequate parking. Interpretive displays and wayside exhibits would be developed at this facility.

C.13 Service Station. As described in appendix B, the existing service station near the Wahweap Lodge will continue its primary use of providing fuel to visitors. The under-utilized mechanic bays in the same building would be modified to accommodate other commercial activities, such as a convenience store. The site would also be modified to accommodate a boat cleaning station for exotic species control. An interpretive exhibit would provide information about exotic species in the area.

C.14 Fish Cleaning Station. The fish cleaning would be renovated and modified to improve its layout and traffic circulation, and to make its appearance compatible with the adjacent picnic area.

C.15 Dry Boat Storage. The dry boat storage area would be moved from its current location near the concessioner housing area, to the southwestern half of the existing boat rental and overflow parking area. The new dry boat storage area would be authorized for 450 boats. The paved area would be fenced, screened and illuminated with downcast lighting. Office facilities and check-in facilities would be located in the houseboat rental or boat repair building.



ALTERNATIVES CONSIDERED

Locating the dry boat storage in this new area would consolidate similar activities (dry boat storage, boat repair, houseboat rentals and concessioner launch ramp) in one location.

The original site of the dry boat storage would be revegetated, restoring the visual character of a highly visible ridgeline. Relocation of the facility would also remove any need for visitors to frequent the employee housing area.

C.16 Construction Area. Under this alternative, the reduction of concessioner housing (element C.1) and relocation of the dry boat storage area from the housing area would provide a major opportunity to modify the construction area layout. The location of the facility would be relocated away from the ridgeline and west along Stateline Drive. The construction area layout would be modified to reduce visibility, consolidate activities, separate visitor and employee uses, enhance circulation and improve efficiency. The facility's overall size would not change. The maintenance building would be relocated out the viewshed, substantially improving the visual quality of the prominent ridgeline. The construction area's screening would be upgraded as well. Any disturbed areas would be rehabilitated to a natural state.

C.17 Commercial Laundry Facility. The concessioner housekeeping/laundry serves lake wide concessioner laundry needs. Locating the housekeeping/laundry facility in Page would provide a centralized location for these services and benefit the local economy. The building will be reused with a function to be determined.

C.18 NPS Storage Yard. The NPS storage yard would remain in its current location and configuration. The layout of the facility would be modified within its existing boundary to improve operational efficiency. Internal and external screening would be added to improve the visual quality of the area.

C.19 Food Service Facility. Alternative C outlines a number of facility improvements, including the expansion of the Wahweap Lodge facilities, expanded campground and new parking. These improvements would increase demand for food services. Two additional food service facilities would be provided, one at Stateline and another at the Wahweap Lodge, to supplement existing services at Wahweap Lodge, the marina and campground stores. The additional food service facility at Wahweap Lodge would be considered in conjunction with the expansion of meeting room and guest room facilities.

Included in this alternative is the creation of another primary activity area at the Stateline Launch Ramp. A new food service facility in this area along with improvements in parking, the relocation of dry boat storage, the expansion of the campground, and the development of a houseboat loading area would dramatically increase use of this area. A shuttle would help move visitors between restaurants located at the Wahweap and Stateline activity nodes.



C.20 Recycling Transfer Station. As discussed in the Integrated Solid Waste Alternative Program Plan (D. A. Kahl Consulting, 1999) for Glen Canyon National Recreation Area,

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there is a need for a recycling transfer facility in the area. NPS would work with a local commercial provider to evaluate the feasibility of locating a recycling transfer station within Wahweap. This alternative would create a new outdoor transfer, storage and truck loading area for bulk recycling materials collected from within the NRA near the construction maintenance area.

2.3.3 Water Based Facilities

C.21 Boat Ramps. The Wahweap area would continue to be served by two public boat ramps, Wahweap and Stateline. Low lake levels have necessitated improvements to these boat ramps to support boating activities during periods of low water.

To reduce pressure on the Wahweap ramp, facilities would be improved near the Stateline Launch Ramp, including improvements to parking (element C.4) and a new food service facility (element C.19). These new services would provide an incentive to use the ramp. A shuttle system would provide transit services between these launch ramps during peak seasons. The shuttle system would help distribute people between these activity nodes.

C.22 Docks. As outlined in alternative B, the Wahweap fuel dock would be expanded and upgraded to improve safety and provide secondary containment. The fuel dock at Stateline would be maintained at its current size, but upgraded to improve safety and provide secondary containment. A new commercial boat loading area and access ramp constructed adjacent to the Stateline Launch Ramp would improve operational efficiency of the ramp.



C.23 Marina. The Wahweap Marina would remain the only marina serving Wahweap. Wet storage allocation would remain at:

- a total of 870 slips
- mooring buoy capacity of 180
- overnight slips would be increased from 40 to 90, which includes replacing “H” dock and a combination of slip-docks and overnight slips.
- 40 new slips would be added for administrative, executive or commercial uses.
- total allocation of slips, end-tie and buoy numbers on the marina would be 1,180.

The marina store would be renovated or expanded to include office space and additional food service facilities. The service shop and executive service operation and the marina would be maintained. The electrical system is also currently being upgraded to improve efficiency.

To avoid traffic congestion between the Stateline and Wahweap Marina areas, an alternative mode transportation system would be implemented. This new shuttle system would operate during peak periods between Stateline and Wahweap facilities. This public transportation system would help reduce the demand for services in the Wahweap Marina area.

ALTERNATIVES CONSIDERED

The Wahweap Marina would be improved to meet the requirements of the Americans with Disabilities Act of 1990. An accessible route to the Wahweap Marina and fishing dock would also be constructed.

C.24 Boat Rentals. As described in alternative A, boat rentals would be maintained at the current limit of 325 (175 houseboats and 150 small boats) and PWC rentals would be limited to 35.

C.25 Tour Boats. As described in alternative B, the concessioner would be limited to 12 tour boats (maximum of 149 passengers each) and would upgrade the existing fleet and facilities to provide accessibility accommodations. This allocation is a reduction from the currently authorized fleet of 20, but is an increase of 3 boats over the existing fleet of 9. New and replacement vessels would incorporate new technology to reduce wake and improve energy efficiency. To better service visitors, a land-based staging area for high water tour boat operations would be constructed, improving seating and a shade shelter.

C.26 Wastewater Treatment. The Wahweap Wastewater Management Upgrade/Environmental Assessment, 2002 proposes to reclaim the sewage lagoons and transfer sewage to the City of Page wastewater treatment system. Since an EA was previously conducted, an analysis of implementing this action is not included in this document.

2.4 ALTERNATIVES CONSIDERED BUT DISMISSED

2.4.1 Alternative Housing Programs

Optional housing programs were discussed during project scoping. Housing programs ranging from no concessioner housing to providing housing for all employees were considered. Three alternatives were evaluated, included providing housing for 30, 205 and 275 (no-action) employees. Housing ranges were based on meeting the criteria outlined in the National Park Service Housing Management Handbook, 1997, which states only Category I (First Response) and Category II (units needed because of seasonality, remoteness, etc.) housing should be provided. Therefore, providing housing for every concessioner employee and no employees was not considered.

2.4.2 New Stateline Marina

Removing a portion of the Wahweap Marina and redistributing it to a new Stateline Marina was discussed during a NPS workshop. The new marina would be located in the State of Utah, with the existing Wahweap Marina remaining in Arizona. Socioeconomic impacts to the private owners and the concessioner of the boats moored in the new Utah marina would result from increases in taxes. Additional costs would result from construction of the new marina and related utilities. In addition, the existing Wahweap Marina has recently undergone upgrades, including electrical to meet the current demand. Based on the current analysis of the planning objectives, the operational complexity and economic impacts has warranted the exclusion of this alternative.

2.5 COMPARISON OF ALTERNATIVES

Table 2-2 summarizes the components of each of the alternatives. Table 2-3 summarizes and compares the potential environmental consequences associated with each alternative. A cost comparison of each alternative is provided in appendix C. The results of the impact analysis and definitions/explanations of impact levels are provided in chapter 4.

ALTERNATIVES CONSIDERED

Table 2-2 Alternatives

#	Element	Alternative A (No-Action) Figure 2-1	Alternative B (Alternative) Figure 2-2	Alternative C (Preferred) Figure 3-3
Housing				
1	Concessioner Housing	<ul style="list-style-type: none"> Preserve and maintain existing housing stock 	<ul style="list-style-type: none"> Remove all mobile homes, trailers, and dormitories from concessioner housing area Remove all but 30 First Response personnel to meet operational needs for visitor services and provide timely emergency response (24 hour) as needed 	<ul style="list-style-type: none"> Remove all mobile homes or trailers Replace existing dorms over time Define development area limits Define minimum and maximum densities Define maximum building height zones Maximum Concession employees to be housed: 175 Seasonal, 30 First Response personnel
2	Cabins	<ul style="list-style-type: none"> Remain in current location and continue current housing use with modifications to ensure they are in accordance to housing code 	<ul style="list-style-type: none"> Coordinate with AZ SHPO Record documentary evidence of the cabins and remove structures. Provide interpretive feature such as wayside exhibit on lodge grounds for public viewing 	<ul style="list-style-type: none"> Coordinate with AZ SHPO Maintain structures and district. Stabilize and close up cabins and maintain district in current location and prevent unauthorized access.
Land Facilities / Actions				
3	Campground	<ul style="list-style-type: none"> Retain current campground facilities completing approved and funded improvements 	<ul style="list-style-type: none"> Implement total number as in '98 DCP Modification of types of sites and modified footprint. Provide 283 sites (191 Hook-up, 59 Non-Hook-up, 18 walk-in tent, 15 group sites) 	<ul style="list-style-type: none"> Implement total number as in '98 DCP Modification of types of sites and modified footprint. Provide 283 sites (191 Hook-up, 59 Non-Hook-up, 18 walk-in tent, 15 group sites)
4	Launch Ramp Parking	<ul style="list-style-type: none"> No additional parking facilities 	<ul style="list-style-type: none"> Develop up to 365 car/trailer parking in gravel overflow area across from Stateline Launch Ramp 	<ul style="list-style-type: none"> Develop up to 365 car/trailer parking in gravel overflow area across from Stateline Launch Ramp Provide shuttle between Stateline parking and Wahweap launch ramp
5	Visitor Contact Station	<ul style="list-style-type: none"> No visitor contact station 	<ul style="list-style-type: none"> Create new visitor contact station in proximity to the south entrance fee stations 	<ul style="list-style-type: none"> Expand the building footprint for NPS visitor contact services or renovate existing contact area within the Wahweap District Ranger's Office
6	Fee Stations	<ul style="list-style-type: none"> No upgrade in facilities 	<ul style="list-style-type: none"> No upgrade in facilities 	<ul style="list-style-type: none"> Upgrade fee station booths at South and North entrances to include storage, larger booths with upgraded HVAC, shade protection, restrooms and employee break area.
7	Fire Station	<ul style="list-style-type: none"> Complete construction of new fire station adjacent to District Ranger's Office as described in the '98 DCP. 	<ul style="list-style-type: none"> Complete construction of new fire station adjacent to District Ranger's Office as described in the '98 DCP. 	<ul style="list-style-type: none"> Complete construction of new fire station adjacent to District Ranger's Office as described in the '98 DCP.

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Table 2-2 Alternatives Continued

#	Element	Alternative A (No-Action) Figure 2-1	Alternative B (Alternative) Figure 2-2	Alternative C (Preferred) Figure 3-3
8	NPS Maintenance Area	<ul style="list-style-type: none"> No change in current facilities 	<ul style="list-style-type: none"> Renovate existing fire bay for water lab and storage expansion within existing building footprint Renovate lower warehouse for storage within existing building footprint Provide additional equipment and NPS boat storage within maintenance area boundary 	<ul style="list-style-type: none"> Renovate existing fire bay for water lab and storage expansion within existing building footprint Renovate lower warehouse for storage within existing building footprint Provide additional equipment and NPS boat storage within maintenance area boundary
9	Bicycle Trail	<ul style="list-style-type: none"> No bike trail is planned 	<ul style="list-style-type: none"> Provide bicycle trail from Page to Wahweap. 	<ul style="list-style-type: none"> Provide bicycle trail from Page to Wahweap.
10	Recreational Vehicle Park	<ul style="list-style-type: none"> Relocate a portion of visitor RV sites to campground area 	<ul style="list-style-type: none"> Relocate visitor RV sites to campground area. 	<ul style="list-style-type: none"> Relocate visitor RV sites to campground area.
11	Lake Powell Motel	<ul style="list-style-type: none"> No change in current facilities and operation 	<ul style="list-style-type: none"> Facility is removed. Disturbed areas revegetated with native plants 	<ul style="list-style-type: none"> Facility is removed. Disturbed areas revegetated with native plants
12	Wahweap Lodge	<ul style="list-style-type: none"> No change in current facility and operation 	<ul style="list-style-type: none"> No expansion of lodge rooms Remodel existing buildings for meeting room areas Modify parking area to improve drop off and traffic circulation Remodel existing lodge rooms/buildings to meet fire code 	<ul style="list-style-type: none"> Wahweap Lodge facilities are expanded for up to 25 additional rooms Expand existing building footprint to add meeting room areas Modify parking area to improve drop off and traffic circulation Remodel existing lodge rooms/buildings to meet fire code
13	Service Station	<ul style="list-style-type: none"> No changes to current facility 	<ul style="list-style-type: none"> Remodel existing mechanic bays and building within existing footprint for commercial activities such as a convenience store, fuel services will continue. 	<ul style="list-style-type: none"> Remodel existing mechanic bays and building within existing footprint for commercial activities such as a convenience store, fuel services will continue Renovate site to accommodate additional visitor facilities such as boat cleaning for exotic species control
14	Fish Cleaning Station	<ul style="list-style-type: none"> No change to current facility 	<ul style="list-style-type: none"> No change to current facility 	<ul style="list-style-type: none"> Renovate existing fish cleaning station at or near current location and improve traffic circulation.
15	Dry Boat Storage	<ul style="list-style-type: none"> No change in current facility except for upgraded screen and lighting. 	<ul style="list-style-type: none"> Provide a maximum of (450) spaces Modify existing site layout and location to improve screening and circulation to separate customer access from employee housing area 	<ul style="list-style-type: none"> Relocate dry boat storage to southwest portion of the boat rental parking adjacent to boat repair. Provide perimeter screening Provide a maximum of (450) spaces as in '98 DCP recommendations
16	Construction Area	<ul style="list-style-type: none"> No change in current facility. Screening upgraded and allowable impact areas defined. 	<ul style="list-style-type: none"> Provide equivalent area for construction activities but modify location to improve screening and separate customer, employee and housing circulation 	<ul style="list-style-type: none"> Provide equivalent area for construction activities but relocate to nearby location to improve screening and separate customer, employee and housing circulation Relocate maintenance building to construction area to improve visual quality and operations.

ALTERNATIVES CONSIDERED

Table 2-2 Alternatives Continued

#	Element	Alternative A (No-Action) Figure 2-1	Alternative B (Alternative) Figure 2-2	Alternative C (Preferred) Figure 3-3
17	Commercial Laundry Facility	<ul style="list-style-type: none"> Maintain existing location and size 	<ul style="list-style-type: none"> Maintain existing location and size Re-locate outside NRA when additional capacity is needed 	<ul style="list-style-type: none"> Re-locate outside NRA
18	NPS Storage Yard	<ul style="list-style-type: none"> No change to current facility 	<ul style="list-style-type: none"> Maintain at existing location and size Add perimeter screening 	<ul style="list-style-type: none"> Area remains at the current location but redesigned within existing boundary for operational efficiency Add perimeter and internal screening
19	Food Service Facility	<ul style="list-style-type: none"> No additional food service facility provided 	<ul style="list-style-type: none"> Aside from the expansion of the marina store, no additional food service facility provided. 	<ul style="list-style-type: none"> Expand food service facilities within the existing Lodge and/or build a new facility near Stateline Launch Ramp
20	Recycling Transfer Station	<ul style="list-style-type: none"> No facility is provided 	<ul style="list-style-type: none"> Provide facility outside of park 	<ul style="list-style-type: none"> Provide an outdoor storage and truck loading area for recycling materials collected from within the park near the construction maintenance area
Water-Based Facilities				
21	Boat Ramps	<ul style="list-style-type: none"> Complete extension of boat ramps and/or provide other improvements to support boating use in periods of low water 	<ul style="list-style-type: none"> Complete extension of boat ramps and/or provide other improvements to support boating use in periods of low water 	<ul style="list-style-type: none"> Complete extension of boat ramps or provide other improvements to support boating use in periods of low water. Improve usage of existing parking lots by providing a shuttle between launch ramps and parking areas
22	Docks	<ul style="list-style-type: none"> No change to existing facilities 	<ul style="list-style-type: none"> Expand capacity of Wahweap fuel docks and replace docks to improve safety and provide secondary containment Upgrade Stateline fuel docks to improve safety and provide secondary containment 	<ul style="list-style-type: none"> Expand capacity of Wahweap fuel docks and replace docks to improve safety and provide secondary containment Upgrade Stateline fuel docks to improve safety and provide secondary containment Provide courtesy docks dedicated to staging for commercial boats beside Stateline Launch Ramp

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Table 2-2 Alternatives Continued

#	Element	Alternative A (No-Action) Figure 2-1	Alternative B (Alternative) Figure 2-2	Alternative C (Preferred) Figure 3-3
23	Marina	<ul style="list-style-type: none"> No change to existing facilities 	<ul style="list-style-type: none"> Maintain existing authorized slip, end-tie, and buoy numbers. Replace 40 existing overnight (short-term) rental slips (aka "H" dock) at marina Provide 40 new slips for additional overnight short-term rental Provide 20 new slips for administrative and executive services use (non-rental) at marina Provide 20 new slips for (short-term) rental for other commercial services at marina Rehabilitate/expand marina store to include office space and food service facilities Maintain service shop and executive service operation at marina. 	<ul style="list-style-type: none"> Maintain existing authorized slip, end-tie, and buoy numbers. Improve/replace 40 existing overnight (short-term) rental slips (aka "H" dock) at marina Provide 40 new slips for additional overnight short-term rental Provide 20 new slips for administrative and executive services use (non-rental) at marina Provide 20 new slips for (short-term) rental for other commercial services at marina Rehabilitate/expand marina store to include office space and food service facilities Maintain service shop and executive service operation at marina Provide accessible route to marina and fishing dock. Improve usage of existing parking lots by providing a shuttle between launch ramps and parking areas
24	Boat Rentals	<ul style="list-style-type: none"> Maintain houseboat / boat rental numbers totaling 325 vessels (175 houseboats/150 small boats) PWC rentals would be maintained at 35. 	<ul style="list-style-type: none"> Maintain houseboat / boat rental numbers totaling 325 vessels (175 houseboats/150 small boats) PWC rentals would be maintained at 35. 	<ul style="list-style-type: none"> Maintain houseboat / boat rental numbers totaling 325 vessels (175 houseboats/150 small boats) PWC rentals would be maintained at 35.
25	Tour Boats	<ul style="list-style-type: none"> No change to existing facilities 	<ul style="list-style-type: none"> Reduce previously authorized tour boat fleet from 20 to 12 vessels (allowing a net increase to current fleet (9) of 3 boats) Provide accessible tour boat accommodations 	<ul style="list-style-type: none"> Reduce previously authorized tour boat fleet from 20 to 12 vessels (allowing a net increase to current fleet (9) of 3 boats) Provide accessible tour boat accommodations Provide a land-based staging area for high water tour boat operations such as a shade shelter with seating
Other Facilities				
26	Wastewater Treatment	<ul style="list-style-type: none"> As per the Wahweap Wastewater Management Upgrade/Environmental Assessment (2003), wastewater transferred to Page. 	<ul style="list-style-type: none"> As per the Wahweap Wastewater Management Upgrade/Environmental Assessment (2003), wastewater transferred to Page. 	<ul style="list-style-type: none"> As per the Wahweap Wastewater Management Upgrade/Environmental Assessment (2003), wastewater transferred to Page.

ALTERNATIVES CONSIDERED

Table 2-3. Summary of Wahweap Environmental Consequences

Impact Topic	Alternative A (No-Action)	Alternative B	Alternative C (Preferred)
1. Water Quality	Long-term, negligible, adverse impacts on surface water quality would occur from continued recreational uses, including potential leaks and spillage of boat fuels. No violations of water quality standards would be expected.	Alternative B would result in short-term, negligible, adverse impacts on water quality from runoff during construction. Long-term, negligible, adverse impacts on surface water quality would occur from continued recreational uses, including potential leaks and spillage of boat fuels. No violations of water quality standards would be expected.	Alternative C would result in short-term, negligible, adverse impacts on water quality from runoff during construction. Long-term, negligible, adverse impacts on surface water quality would occur from continued recreational uses, including potential leaks and spillage of boat fuels. No violations of water quality standards would be expected.
2. Air Quality	Long-term, negligible, adverse impacts on air quality from continued recreational uses, including emissions from cars, campers, and boats would occur.	Alternative B would create short-term, negligible, adverse impacts from the generation of dust during the construction process. Also long-term, negligible to minor, adverse impacts on air quality from continued recreational uses, including emissions from cars, campers, and boats would occur.	Alternative C would create short-term, minor to moderate, adverse impacts from the generation of dust during the construction process. Also long-term, negligible, adverse impacts on air quality from continued recreational uses, including emissions from cars, campers, and boats would occur.
3. Soundscape	Alternative A would result in short and long-term, minor to moderate, adverse impacts on the natural soundscape due to the ongoing activities of visitors.	The actions taken during construction of new facilities would result in short-term, minor to moderate, adverse impacts on the natural soundscape. Alternative B would add new and expanded facilities, but these would be in locations already used for similar purposes. Long-term, adverse effects would be minor to moderate.	The actions taken during construction of new facilities would result in short-term, minor to moderate adverse impacts on the natural soundscape. Alternative C would add new and expanded facilities, including sites that are removed from currently developed areas. This new development would result in minor to moderate, long-term adverse effects.
4. Wildlife and Wildlife Habitat	Impacts resulting from implementation of Alternative A would be long-term, minor, and adverse due to disturbance from visitors and residents and by the presences of facilities in the area. Long-term, minor, beneficial impacts to wildlife would result from moving the recreational vehicle park to the campground area.	Impacts resulting from implementation of Alternative B would be long-term, minor, and adverse from increased disturbance, presences and development of facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the area to natural conditions.	Impacts resulting from implementation of Alternative C would be long-term, minor, and adverse from construction of additional facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the areas to natural conditions.
5. Soils	Impacts resulting from implementation of Alternative A would be long-term, minor, and adverse caused disturbance from by visitors and residents and by the presences of facilities in the area. Long-term, minor, beneficial impacts to wildlife would result from moving the recreational vehicle park.	Impacts resulting from implementation of Alternative B would be long-term, minor, and adverse from increased disturbance, presences and development of facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the area to natural conditions.	Impacts resulting from implementation of Alternative C would be long-term, minor, and adverse from construction of additional facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the areas to natural conditions.

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Table 2-3. Summary of Wahweap Environmental Consequences

Impact Topic	Alternative A (No-Action)	Alternative B	Alternative C (Preferred)
6. T&E Species	Impacts on special status species would be long term, negligible (no effect), and adverse because of continued disturbance and degradation of habitat at Wahweap from the presence of facilities and visitors. These negligible impacts would likely not adversely affect listed species as none are known to occur in the area.	Impacts on special status species would be long term, negligible (no effect), and adverse because of continued disturbance and degradation of habitat at Wahweap from the presence of facilities and visitors. Impacts would likely not adversely affect listed species as none are known to occur in the area.	Impacts on special status species would be long term, negligible (no effect), and adverse because of continued disturbance and degradation of habitat at Wahweap from the presence of facilities and visitors. Impacts would likely not adversely affect listed species as none are known to occur in the area.
7. Vegetation	Impacts resulting from implementation of Alternative A would be long-term, minor, and adverse caused by disturbance from visitors and residents and by the presence of developed facilities in the area. Long-term, minor, beneficial impacts to vegetation would result from moving the recreational vehicle park.	Impacts resulting from implementation of Alternative B would be long-term, minor, and adverse from increased disturbance, presence and development of facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the area to natural conditions.	Impacts resulting from implementation of Alternative C would be long-term, minor, and adverse from construction of additional facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the areas to natural conditions.
8. Visitor Experience	Long-term, minor beneficial impacts to the visitor experience would result from the implementation of pre-approved projects.	Long-term, minor to moderate beneficial impacts to the visitor experience would result from the overall improvement of facilities available the public such as the visitor contact station.	Long-term, moderate beneficial impacts to the visitor experience would result from the overall improvement of facilities available the public such as the visitor contact station and the relocation of the dry boat storage area closer to the launch ramp.
9. Visual Resource	Long-term, negligible, beneficial impacts would occur due to moving the recreational vehicle park to the campground area.	Long-term minor to moderate beneficial impacts would occur due to removal of the Lake Powell Motel, modification of housing, and moving of dry boat storage. Long-term, minor adverse impacts would occur due to expansion of the campground and construction of new visitor contact station.	Long-term minor to moderate beneficial impacts would occur due to removal of the Lake Powell Motel, modification of housing, and moving of dry boat storage. Long-term, minor, adverse impacts would occur due to expansion of campground and other facilities.
10. Socioeconomic	Alternative A would have a long-term, negligible, beneficial impact on socioeconomic conditions in the Wahweap area due to continued visitation to the area helping to maintain the economy.	Alternative B would have a long-term, moderate, beneficial impact on socioeconomic conditions in the Wahweap area due to increased visitation and enhanced facilities available to the public and from increased demand for private housing and income generated from rent for Page and the surrounding area. Alternative B would also have a long-term, moderate, adverse impact on seasonal workers having to find rental housing in adjacent local communities.	Alternative C would have a long-term, moderate, beneficial impact on socioeconomic conditions in the Wahweap area due to increased visitation and enhanced facilities available to the public and from increased demand for private housing and income generated from rent for Page and the surrounding area. Alternative C would also have a long-term, minor, adverse impact on permanent workers having to find housing in adjacent local communities.

ALTERNATIVES CONSIDERED

Table 2-3. Summary of Wahweap Environmental Consequences

Impact Topic	Alternative A (No-Action)	Alternative B	Alternative C (Preferred)
11. Cultural Resources	Retaining the Wahweap Trailer Village Cabins would have a minor-to-moderate beneficial impact in the short and long term. Under this alternative, negligible to minor adverse impacts, over the short and long term, would result for prehistoric archeological resources bases on illegal collecting or prehistoric resource damage. Implementation of this alternative would not result in an impairment of cultural resources.	Removal of the cabins would result in a major, adverse action over the short and long term. Should the Arizona SHPO concur, removal of the Lake Powell Motel would have no effect. While known archeological resources would be avoided during construction, potential visitor impacts would continue resulting in a negligible-to-minor adverse impact over the short and long term to prehistoric resources. Implementation of this alternative would not result in an impairment of cultural resources.	This alternative would have direct and in-direct, short- and long-term, negligible-to-minor, beneficial effects on prehistoric archeological and historic resources. There would also be minor adverse impacts from visitors illegally collecting or damaging resources. Implementation of this alternative would not result in an impairment of cultural resources.
12. Parks Operation	Long-term, negligible, beneficial impacts to park operations would occur from the improvement to the fire station.	Park operations would have long-term, minor to moderate beneficial impacts. Beneficial impacts include enhancing operations and facilities at boat launch and marina facilities as well as concentrating dry boat storage.	Park operations would have long-term, minor to moderate beneficial impacts. Beneficial impacts include enhancing operations and facilities at boat launch ramp, relocating the dry boat storage closer to the launch area and construction of an improved fee station.
13. Public Safety	Long-term, negligible, beneficial impacts to park operations would occur from the improvement to the fire station.	Alternative B would have long-term, minor, beneficial effects. Beneficial effects would result from an improvement of site facilities and by dispersion of visitors to key activity centers	Alternative C would have long-term, minor, beneficial effects. Beneficial effects would result from an improvement of site facilities and by dispersion of visitors to key activity centers
14. Transportation and Traffic	Long-term, negligible, adverse impacts to transportation and traffic operations would occur due to continued visitation to the area.	Alternative B would have long-term, minor, beneficial effects. Beneficial effects would result from an improvement of site facilities and by dispersion of visitors to key activity centers	Alternative C would have long-term, minor, beneficial effects. Beneficial effects would result from an improvement of site facilities and by dispersion of visitors to key activity centers

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2.6 COMPARISON TO PROJECT OBJECTIVES

The preferred alternative would achieve the nine planning objectives defined in chapter 1. A comparison of alternatives and planning objectives is illustrated in table 2-4.

Table 2-4 - Comparison with Project Objectives			
Goal	Alternative A (No-Action)	Alternative B	Alternative C
1. Direct future development and activities in a manner that build upon the goals and objectives of the GMP.	○	●	●
2. Preserve the quality of natural resources and recreational opportunities while not exceeding land development allowances and established lake carrying capacities.	●	●	●
3. Identify concessioner's commercial, operational, and maintenance needs.	○	●	●
4. Respond to housing needs, guidance and legislation.	●	●	●
5. Update management guidance based on existing conditions, visitation, user demand, patterns and needs.	○	●	●
6. Evaluate the age, type and condition of existing facilities.	○	●	●
7. Improve operational efficiency of services and facilities.	○	●	●
8. Protect the landscape character and quality including key viewsheds.	○	●	●
9. Integrate existing and proposed services with the local economy where appropriate	○	●	●

○ = Does not meet goal, ● = Partially meets goal, ● = Meets goal

2.7 ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative would best promote the national environmental policy expressed in the National Environmental Policy Act. The Environmentally Preferred Alternative would cause the least damage to the biological and physical environment, and would best protect, preserve and enhance historical, cultural and natural resources.

Section 101(b) of the National Environmental Policy Act identifies six criteria to help determine the environmentally preferred alternative. A comparison of the alternatives against these criteria is described in table 2.5

ALTERNATIVES CONSIDERED

Table 2-5 - Comparison with NEPA Criteria

Goal	Alternative A (No-Action)	Alternative B	Alternative C
1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.	●	●	●
2. Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings.	○	●	●
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.	●	●	●
4. Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.	○	●	●
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.	○	●	●
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."	●	●	●

○ = Does not meet goal, ● = Partially meets goal, ● = Meets goal

The no-action alternative (alternative A) represents the current status of the Wahweap Marina area. The need for modifications from the existing conditions described in alternative A derives from several considerations, including changes in legislation and unforeseen economic conditions that have had a significant impact on operations of the area. Based on these changes, most elements of the 1998 DCP have changed. For example, directives regarding housing have changed, encouraging non-essential employees to be housed outside of the NRA. Congestion and the lack of adequate parking create operational concerns at the Wahweap Launch Ramp area. Existing facilities are not ideally located and thus diminish the visual quality of the area and reduce operational efficiency. The overall result is a mismatch between some existing facilities and NPS objectives, concessioner needs and visitor demands. As shown in table 2-5, alternative A does not fully meet the criteria and objectives described above.

Alternative B would combine compatible elements that reduce the existing issues at Wahweap. Project elements would include modifying the layout and reducing the size of concessioner housing; improving the layout of dry boat storage and construction yards to improve visual quality; and providing additional amenities, such as a new visitor contact station and upgraded parking near Stateline Launch Ramp. This alternative complies with other guidance as described in the 1997 NPS Housing Management Handbook, but does not include the need for the temporary work force at Wahweap. Alternative B does not fully achieve all the criteria and objectives described above.

After careful review of potential resource and visitor impacts, the environmentally preferred alternative is alternative C. Alternative C would relocate and improve the layouts of the dry boat storage, housing and the construction area to improve operational efficiency, separate employee and visitor use areas and enhance visual quality. Additional facilities, such as

upgraded parking, meeting rooms and food service facilities would also improve the visitor's experience and disperse use to two primary activity areas. In addition, the alternative complies with other guidance as described in the 1997 NPS Housing Management Handbook and Section 106. The alternative provides for both Category I and II housing and preserves cabins eligible for the National Register of Historic Places.

As described in appendix F, this alternative would restore more land than impacted. Approximately, 7 acres of new area would be disturbed and 18 acres of land previously developed or disturbed would be restored. Overall, alternative C would (1) provide a high level of protection of natural and cultural resources, while concurrently attaining the widest range of neutral and beneficial uses of the environment without degradation; (2) maintain an environment that supports diversity and variety of individual choices; and (3) integrate resource protection with an appropriate range of visitor use. As shown in table 2-3, alternative C would surpass the other alternatives in meeting the full range of national environmental policy goals as stated in Section 101 of NEPA and the DCP objectives.

2.8 MITIGATION MEASURES COMMON TO BOTH ACTION ALTERNATIVES

To minimize resource impacts, the following design features (i.e. mitigation measures) would be followed during implementation of either of the action alternatives, and are analyzed as part of the action alternatives. These actions were developed to lessen the potential for adverse effects of the proposed action, in combination with foreseeable future actions, and have proven to be very effective in reducing environmental impacts on previous projects.

2.8.1 Contractor Orientation

Contractors would be given orientation concerning proper conduct of operations. This orientation is provided in both written form and verbally at a preconstruction meeting. Orientation topics include:

- Wildlife should not be approached or fed.
- Collecting any Park resources, including plants, animals, and historic or prehistoric materials, is prohibited
- Contractor must have a safety policy in place and follow it.
- A vehicle fuel leakage and spill plan will be developed and implemented for this project.
- Other environmental concerns and requirements discussed elsewhere in this EA would be addressed, including relevant mitigation measures listed below.

ALTERNATIVES CONSIDERED

2.8.2 Limitation of Area Affected

The following mitigation measures will be implemented to minimize the area affected by construction activities:

- The staging area for the construction office (a trailer), construction equipment, and material storage will be located in previously disturbed areas near the project site. All staging areas will be returned to pre-construction conditions once construction is complete.
- Construction zones will be fenced with construction tape, snow fencing, or some similar material before any construction activity. The fencing will define the construction zone and confine activity to the minimum area required for construction. All protection measures will be clearly stated in the construction specifications, and workers will be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing.

2.8.3 Soil Erosion

To minimize soil erosion, the following mitigation measures will be incorporated into the action alternatives.

- Standard erosion control measures such as silt fences, sand bags, or equivalent control methods will be used to minimize any potential soil erosion.
- Any trenching operations will be by rock saw, backhoe, trackhoe, and/or trencher, with excavated material side-cast for storage. After trenching is complete, bedding material will be placed and compacted in the bottom of the trench and the utility lines installed in the bedding material. Back filling and compaction will begin immediately after the utility lines are placed into the trench, and the trench surface will be returned to pre-construction contours. All trenching restoration operations will follow guidelines approved by Park staff. Compacted soils will be scarified and original contours reestablished.
- A Salvage and Revegetation Plan will be developed for the project by a landscape architect or other qualified individual, in coordination with the Park Restoration Biologist. Any revegetation efforts will use site-adapted native species and/or native seed.

2.8.4 Water Quality

To minimize potential impacts to water quality, the following mitigation measures will be incorporated into the action alternatives.

- A storm water pollution prevention plan (SWPPP) will be developed by the contractor and approved by the Park prior to any ground-disturbing activities. All

National Pollutant Discharge Elimination System (NPDES) requirements will be met.

- Standard erosion control measures such as silt fences, sand bags, or equivalent control methods will be used to minimize any potential sediment delivery to streams.

2.8.5 Special Status Species

To protect any unknown or undiscovered threatened, endangered, or special status species, the construction contract will include provisions for the discovery of such. These provisions will require the cessation of construction activities until Park staff evaluate the project impact on the discovery and will allow modification of the contract for any protection measures determined necessary to protect the discovery.

2.8.6 Visual Resources

To minimize visual impacts, mitigation measures will include the following:

- Trenching for underground utilities will be limited as much as possible to a 10-foot wide fenced construction zone.
- Natural, muted colors will be used to blend any metal surfaces into the landscape.

2.8.7 Visitor Experience

The following mitigation measures will be incorporated into the action alternatives to minimize the impacts of construction activities on the visitor experience:

- The Park may consider restricting construction activities during peak use days such as holidays and some weekends during the busiest times of the year to minimize disruption to visitors.
- Traffic in any one direction will not be stopped for more than 15 minutes to minimize disruption to traffic flow.
- Unless otherwise approved by the Park, operation of heavy construction equipment will be restricted to 8:00 am to 6:00 pm in the summer (May 1-September 30) and to 9:00 am to 5:00 pm during the rest of the year.
- Information regarding implementation of this project would be shared with the public upon their entry into the park during construction periods. This may take the form of an informational brochure or flyer about the projects distributed at the gate and sent to those with reservations at park facilities, postings on the park's website, and/or other methods.

ALTERNATIVES CONSIDERED

2.8.8 Air Quality

Air quality impacts of the action alternatives are expected to be temporary and localized. To minimize these impacts, the following actions will be taken:

- To reduce entrainment of fine particles from hauling material, sufficient freeboard will be maintained and loose material loads (aggregate, soils, etc.) will be tarped.
- To reduce tailpipe emissions, construction equipment will not be left idling any longer than is necessary for safety and mechanical reasons.
- To reduce construction dust in the short term, water will be applied to problem areas. Equipment will be limited to the fenced project area to minimize soil disturbance and consequent dust generation.
- Landscaping and revegetation will control long-term soil dust production. Mulch and the plants themselves will stabilize the soil and reduce wind speed/shear against the ground surface.

3.0 Affected Environment

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3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section describes the affected environment, or physical and social conditions currently present within the project site. As illustrated in figure 3.1, the area examined considers primarily the Wahweap Marina project area.



3.2 WATER QUALITY

3.2.1 Physical Characteristics of Lake Powell

The construction of Glen Canyon Dam formed Lake Powell by impounding the Colorado River. The waters of the lake are clear, deep and thermally stratified. Hydrologic characteristics of Lake Powell are summarized in table 3-1. Water releases depend on water demands and hydropower production requirements. By law, Glen Canyon Dam must release 8.23 million acre-feet each year, which represents about one-third of its holding capacity.

Daily releases are highest in the heat of summer (to meet demands for irrigation and electricity production) and on cold winter nights (when hydropower helps meet electricity demand peaks).

Lake Powell is designed to operate between elevation 3,490 and 3,700 feet above mean sea level. As the water level changes, the surface of Lake Powell varies in size from 52,000 acres to 163,000 acres and the shoreline fluctuates from 990 miles to 1,960 miles in length. The lake is located in both the States of Utah and Arizona.

TABLE 3-1: HYDROLOGIC CHARACTERISTICS OF LAKE POWELL

<u>Parameter</u>	<u>Value</u>
Volume at full pool	27 million acre-feet
Mean annual inflow ¹	11.4 million acre-feet
Minimum annual outflow ²	8.23 million acre-feet
Annual evaporation	0.5 million acre-feet
Surface water temperature	50°–80°F
¹ . Sum of flows from four major tributaries. ² . Releases from Glen Canyon Dam (minimum required by law).	

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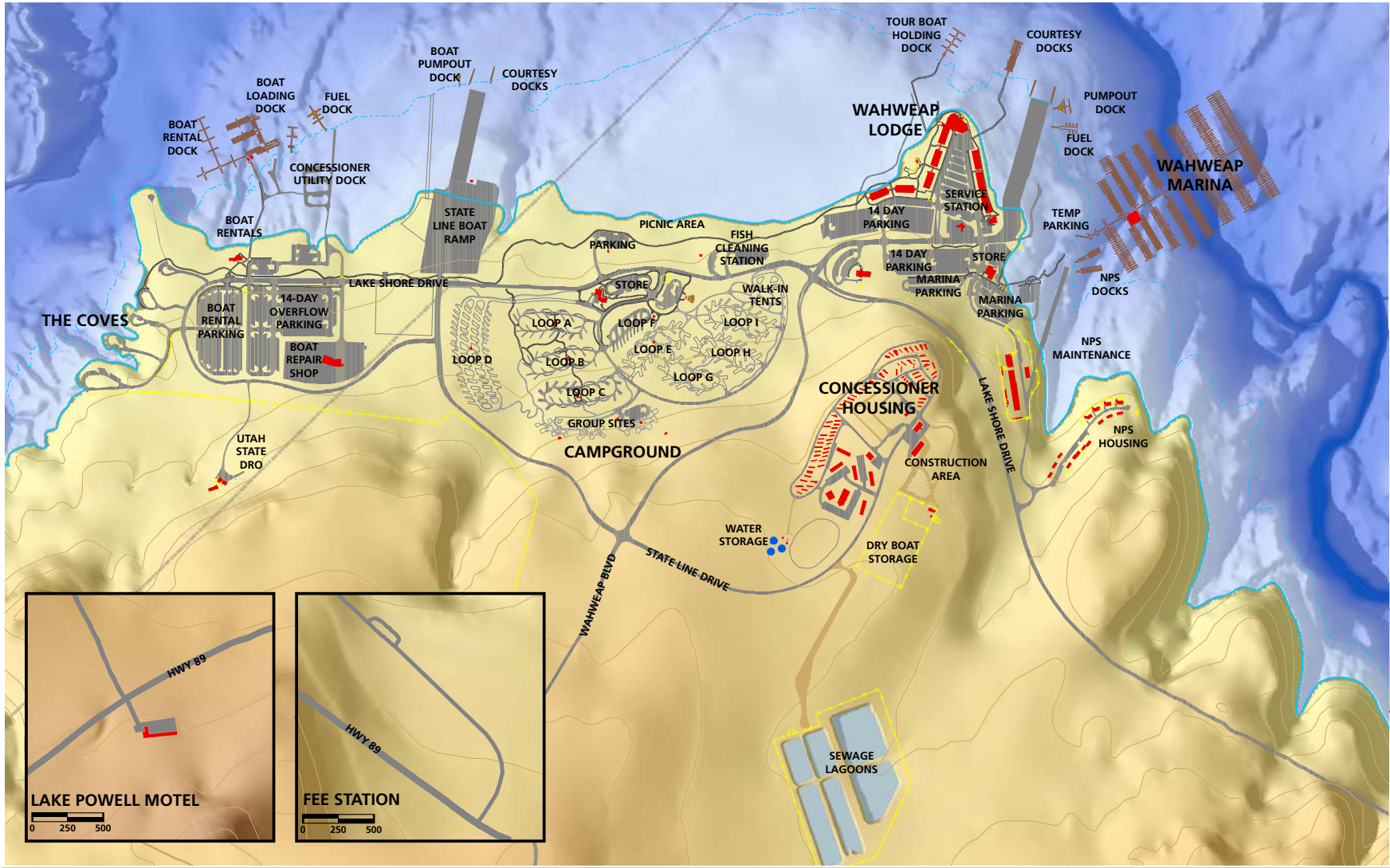


Figure 3.1
Existing Conditions

- Buildings
- 40 Ft. Contours
- Planned Roads and Walks
- Fence
- High Shoreline (Elev 3700)
- Low Shoreline (Elev 3610)



The major tributary rivers to Lake Powell are the Colorado, San Juan, Dirty Devil and Escalante, which encompass a drainage basin of approximately 111,700 square miles. This impoundment stretches along 186 miles of the Colorado River and 55 miles of the San Juan River. Upstream land uses include mining, irrigated crop production, livestock grazing, and urban development. These activities can affect both the chemical and physical characteristics of rivers in the watershed. There are no permanent natural water bodies or perennial streams present in the Wahweap area.

3.2.2 Utah and Arizona State Water Quality Standards

Surface waters of the state of Utah are described as five classes. The waters of Lake Powell are described for the state of Utah by the classes presented in table 3-2. Utah's anti-degradation policy is included in the Utah Administrative Code, Rule R317-2, Standards of Quality for the State. The policy establishes a plan to maintain and improve the quality of the state's waters for public water supplies; the propagation of wildlife, fish and aquatic life; and agricultural, industrial, recreational and other legitimate uses. The policy states that no waste will be discharged into any waters of the state that would compromise the beneficial uses of the receiving waters.

Lake Powell has not been designated as high-quality water and is not afforded special protection under Utah statutes. Some reduction in water quality would be allowable to support vital economic activities, as long as designated beneficial use were not affected.

TABLE 3-2: DESCRIPTION WATER CLASSES FOR THE STATE OF UTAH

<u>Class</u>	<u>Description</u>
Class 1	Protected for use as a raw water source for domestic water systems.
Class 1A	Reserved.
Class 1B	Reserved.
Class 1C*	Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
Class 2	Protected for recreational use and aesthetics.
Class 2A*	Protected for primary contact recreation, such as swimming.
Class 2B*	Protected for secondary contact recreation, such as boating, wading or similar uses.
Class 3	Protected for use by aquatic wildlife.
Class 3A	Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
Class 3B*	Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
Class 3C	Protected for non-game fish and other aquatic life, including the necessary aquatic organisms in their food chain.
Class 3D	Protected for waterfowl, shore birds and other water.
Class 3E	Severely habitat.
Class 4*	Protected for agricultural uses including irrigation of crops and stock watering.
Class 5	The Great Salt Lake. Protected for primary and secondary contact recreation, aquatic wildlife and mineral extraction.
Classes with asterisk () represent water in Lake Powell.	

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Arizona has established the following designated uses for the waters of Lake Powell within the state (Arizona Administrative Code, Title 18, Chapter 11 - Water Quality Standards 1996):

- Aquatic and wildlife coldwater – Use of surface water by animals, plants or other organisms, including salmonids (trout) for habitation, growth or propagation.
- Full-body contact – Use of a surface water for swimming.
- Domestic water supply – Use of a surface water source as a potable water supply. This designation recognizes that treatment processes such as coagulation, sedimentation, filtration or disinfection may be necessary to yield a finished water suitable for human consumption.
- Fish consumption – Use of a surface water by human for harvesting aquatic organisms for consumption.
- Agricultural irrigation – Use of a surface water for the irrigation of crops.
- Agricultural livestock watering – Use of a surface water as a supply of water for consumption by livestock.

The concentrations of contaminants of concern in Lake Powell compared to the Arizona standards for the lake's designated uses are provided in table 3-3.

TABLE 3-3: ARIZONA AND UTAH WATER QUALITY STANDARDS FOR SELECTED POLLUTANTS

	Benzo(a) pyrene ($\mu\text{g/L}$)¹	Naphthalene ($\mu\text{g/L}$)	1-methyl naphthalene ($\mu\text{g/L}$)	Benzene ($\mu\text{g/L}$)	Methyl- tertiarybutyl ether ($\mu\text{g/L}$)
Maximum concentration detected in 2001 sampling at Glen Canyon NRA ²	Below detection limit	Below detection limit	0.14	3.43	1.42
Detection limit	0.01	0.01	0.01	0.5	0.17
Arizona standards for designated uses					
Aquatic and wildlife coldwater, acute	NS ²	1,100	NS	2,700	NS
Aquatic and wildlife coldwater, chronic	NS	210	NS	180	NS
Full-body contact	0.2	NS	NS	48	NS
Domestic water supply	0.2	NS	NS	5	NS
Fish consumption	0.002	NS	NS	120	NS
Agriculture irrigation and agricultural livestock watering	NS	NS	NS	NS	NS

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	Benzo(a) pyrene ($\mu\text{g/L}$)¹	Naphthalene ($\mu\text{g/L}$)	1-methyl naphthalene ($\mu\text{g/L}$)	Benzene ($\mu\text{g/L}$)	Methyl- tertiarybutyl ether ($\mu\text{g/L}$)
Utah standards for designated uses					
Class 1C (domestic purposes)	0.0028	NS	NS	1.2 ⁴	NS
Class 2A (primary contact recreation)	NS	NS	NS	NS	NS
Class 2B (secondary recreation)	NS	NS	NS		NS
Class 3B (warm water species)	0.031	NS	NS	71	NS
Class 4 (agricultural uses)	NS	NS	NS		NS
U.S. Environmental Protection Agency recommended criteria for protection of human health ⁴	0.0044	NS	NS	1.2 ³	NS
SOURCE: Draft Environmental Impact Statement for Personal Watercraft Rule-Making, National Park Service, 2002.					
1. $\mu\text{g/L}$ = milligrams per liter, or parts per billion.					
2. NS = no standard					
3. This criterion for benzene is applicable to waters in the immediate vicinity of public drinking water intakes, to general surface waters of the state					
4. Source: U.S. Environmental Protection Agency 1999.					

3.2.3 Water Quality Data

Human waste is a threat to recreation area resources because it can be a source of pathogenic bacteria and nutrients in the water. Control of human and pet waste is being addressed by implementing the Superintendent's Compendium for Glen Canyon National Recreation Area and Rainbow Bridge National Monument, 2003 (2003d).

Lake Powell water quality has been monitored for human waste since 1988. The monitoring periodically shows high concentrations of fecal coliform bacteria, which indicate the presence of untreated sewage. In the early 1990s, several beaches were temporarily closed because of high fecal coliform bacteria levels. There were 11 beach closures in 1995.

In response to these conditions, the National Park Service (NPS) has addressed sanitation and refuse in the Superintendent's Compendium (2003d). The regulations are outlined as follows:

- Within Glen Canyon National Recreation Area all persons camping within one quarter (1/4) mile of the shore of Lake Powell, the San Juan River, Dirty Devil River or the Colorado River, except at locations designated by the Superintendent as having constructed toilets, shall have a means to contain solid human waste

AFFECTED ENVIRONMENT

such as a portable toilet, a marine toilet on a vessel or a self-contained toilet in a recreation vehicle.

- A method of containing solid human waste is required for these locations if campsites are more than 200 yards from any constructed toilet facility.
- Use of a plastic or paper bag as a receptacle for solid human waste and/or for disposal of solid human waste is prohibited unless part of a specifically engineered bag waste containment system containing enzymes and polymers to treat human solid waste, capable of being sealed securely and state approved for disposal in ordinary trash receptacles.
- Locations with constructed toilets: Lone Rock Beach, Upper and Lower Bullfrog, Stanton Creek, Farley Canyon, and designated camps on the Colorado River between Glen Canyon Dam and Lees Ferry.
- Within Glen Canyon National Recreation Area disposal of solid human waste within one quarter (1/4) mile of the shore of Lake Powell, the San Juan River or the Colorado River in any manner other than into a human waste container as described above, a toilet or human waste disposal facility designed for that purpose, is prohibited.
- Human waste from containers other than the specifically engineered bag waste containment system described above shall be disposed of only in designated pumpout or dump station facilities. Disposing of human waste from containers into restroom facility toilets, trash receptacles or in any other manner than into designated facilities within the recreation area is prohibited except the specifically engineered bag waste containment system described above must be approved by Arizona and Utah Departments of Environmental Quality into normal trash receptacles.

Eight floating dump/pump stations and restrooms have been constructed on Lake Powell. Additional seasonal rangers have been added to the staff to enforce sewage containment regulations. The water quality initiatives have been highly successful in reducing contamination of Lake Powell by human sewage. In the recent past, beaches have closed four times due to water contamination, occurring twice in 1998, once in 1999 and one time in 2001.

Other sources of potential pollution are fueling stations at the Wahweap Marinas that sell fuel to boaters. In addition, fueling occurs at launch sites where boaters fill the tanks of small vessels from fuel storage cans. Evidence of pollution can be seen near fueling stations and near launch sites, by even casual observation. The “rainbow sheen” seen on the water surface in these areas is the result of oil and gasoline floating on the water surface. The odor of fuel and combustion can also be detected near these areas (NPS 2002c). All constituents' levels tested for in the PWCFEIS, Benzo(a)pyrene, Naphthalene, 1-methyle naphthalene, Benzene, and Methyl tertiary-butyl ether, were below EPA’s maximum contaminant level for drinking water.

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During the summer of 2001, NPS conducted water quality testing at several locations at Lake Powell, including a high use boating area at Bullfrog Marina with a fueling station. Maximum observed concentrations of hydrocarbons, i.e. emissions of fuel components from watercraft, were below the treated drinking water standard or advisory level for all three compounds for which a standard exists (NPS 2002a). This was true at all four sample locations, including Bullfrog Marina. It should be noted that these sampling results do not provide a complete characterization of hydrocarbon levels in the lake (NPS 2003c).

3.3 AIR QUALITY

3.3.1 Climate

Glen Canyon NRA (NRA) is located in a region with a relatively mild, southwestern climate conducive to long visitor seasons, with low relative humidity, a high percentage of sunshine and relatively large daytime temperature ranges. March through October is pleasant for most outdoor activities. Summer temperatures are generally hot and sunny with average July maximum temperatures of 95°–110°F. January is generally the coldest month with an average high temperature of 43°F, an average low temperature of 24°F and with a record low of -4°F. The 24-hour temperature ranges are significant; a 30°F range is common. The effect of intense sun in open areas during the summer is amplified by the reflection from light-colored soils and water surfaces. Information on the climate of the area is available on the NPS Internet site for Glen Canyon NRA (NPS 2003a).

Precipitation is irregular, averaging less than 7 inches per year with a range of 2.5 to 10 inches. Most precipitation is rain, falling in a two-season pattern: late summer thundershowers and cool winter rains or snow. The thundershowers are a significant planning variable because they cause high surface runoff and flash floods in desert drainages, and can lead to hazardous boating conditions on Lake Powell.

3.3.2 Air Quality

The U.S. Environmental Protection Agency (EPA) and the Arizona Department of Environmental Quality regulate air quality in Arizona through implementation of the Clean Air Act (CAA). The CAA is a federal air quality law, which is intended to protect human health and the environment by reducing emissions of specified pollutants at their source. In accordance with this law, permits are required for any stationary facility that qualifies as a “major source.” Further, the CAA outlines three types of airshed classification areas: Class I, II and III. The Glen Canyon NRA is located within a Class II airshed, in which the demonstrated impact of a new stationary source facility may emit no more than 100 tons of a regulated pollutant annually before needing a permit. The Navajo Tribal Council found that air pollution exists with varying degrees of severity within Navajo Nation lands. Thus, the Navajo Nation enacted its own legislation, the Air Pollution Prevention and Control Act, which is intended to control sources of air pollution on Navajo Nation lands. The Navajo Nation coordinates closely with the EPA regarding new sources.

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The EPA has established primary and secondary National Ambient Air Quality Standards for six criteria pollutants, including carbon monoxide, nitrogen dioxide, particulate matter, ozone, sulfur dioxide and lead. Primary standards are adopted to protect public health, while secondary standards are adopted to protect public welfare. Air quality data for four of the six criteria pollutants that are regulated by the EPA are measured and recorded by Salt River Project at the Glen Canyon Dam next to the Carl Hayden Visitor Center. No data is available for carbon monoxide or lead within the Glen Canyon NRA as these pollutants are not monitored due to historically low concentrations in the area and no exceedances have been recorded for the last five years. Ambient air quality data at Glen Canyon NRA for 1996 through 1999 are presented in table 3-4, with a comparison to the federal standards for those pollutants.

TABLE 3-4: GLEN CANYON AMBIENT AIR QUALITY DATA 1996-2001

	Standard	1996	1997	1998	1999	2000	2001
Sulfur Dioxide (SO₂)							
Maximum 3-hour- $\mu\text{g}/\text{m}^3$	1,300	152	125	70.8	51.3	14	15
Maximum 24-hour- $\mu\text{g}/\text{m}^3$	365	43.6	36.5	24.4	17.5	7	3
Annual Average	80	4.0	5.0	3.5	2.2	0.59	8
Number of Samples*	-	8,201	8,559	8,666	7,947	6,691	98%*
Nitrogen Dioxide (NO₂)							
Maximum 1-Hour - $\mu\text{g}/\text{m}^3$	-	54.7	52.5	97.6	91.7	0.041	0.041
Maximum 24-Hour - $\mu\text{g}/\text{m}^3$	-	23.3	20.5	31.9	34.4	0.014	0.018
Annual Average	100	3.3	4.3	4.6	3.8	0.002	0.002
Number of Samples*	-	7,849	8,555	8,671	8,210	8,370	98%*
Ozone (O₃)							
Maximum 1-Hour - ppm	0.120	0.074	0.069	0.070	0.073	0.070	0.075
Maximum 2 nd Highest - ppm	-	0.073	0.067	0.070	0.070	0.068	0.068
Number of Samples*	-	8,322	8,540	8,634	8,328	8,715	98%*
Particulate Matter (PM₁₀)							
Maximum 24-Hour - $\mu\text{g}/\text{m}^3$	150	40.6	29.2	28.1	20.5	26	27
Annual Average	50	10.3	9.4	7.4	7.4	10.8	9.8
Particulate Matter (PM_{2.5})							
Maximum 24-Hour - $\mu\text{g}/\text{m}^3$	65	-	11.0	10.2	8.7	12.9	-
Annual Average	15	-	4.5	3.3	3.2	4.4	-

SOURCE: Salt River Project, Navajo Generating Station 2000; Arizona Department of Environmental Quality, Annual Report 2001; Arizona Department of Environmental Quality, Annual Report 2002.

* - Number of Sample was replaced in 2001 with a percentage of valid data recovered from samples.

"-" – Data Not Available

$\mu\text{g}/\text{m}^3$ – micrograms per cubic meter.

ppm – parts per million.

* PM2.5 was not regulated or monitored prior to 1997.

3.4 SOUNDSCAPES

Preservation of natural soundscapes is an important mission of the NPS. Natural soundscapes are defined in NPS Management Policies 21001 as a combination of all the natural sounds that occur in a park together with the physical capacity for transmitting natural sounds. Director's Order #47 (NPS 2000) states that the natural ambient sound level of a park is the basis for determining the affected environment in environmental impact statements and other documents prepared for compliance with the National Environmental Policy Act.

Natural sounds occur within and beyond the range of sounds that humans can perceive, and can be transmitted through air, water or solid materials. Natural soundscapes would include all naturally occurring sounds, such as waves on the shoreline, birds calling, wind blowing or the sound of thunder. It would also include "natural quiet" that occurs in the absence of natural or human generated sound. The opportunity to experience natural sounds is an enjoyable part of the experience for some visitors at the recreation area.

Human-caused sounds at Glen Canyon NRA include all types of watercraft, including PWC, automobiles, aircraft and electronic devices, such as radios and horns. Engines are a primary source of human-caused sound at Glen Canyon NRA.

Human sounds are not unexpected or necessarily inappropriate at the recreation area, but are part of the overall soundscape in an area where water activities, picnicking, camping, sightseeing and other recreation use are part of the purpose of the park. Evaluation of the appropriateness of human sounds is evaluated by considering visitor expectation, management guidelines, resource sensitivity and park purpose.

3.4.1 Natural and Human Noise Levels

Noise is generally defined as an unwanted or intrusive sound. Sounds are described as noise if they interfere with an activity or disturb the person hearing them. Sound is measured in a logarithmic unit called a decibel (dBA). Since the human ear is more sensitive to middle and high frequency sounds than to low frequency sounds, sound levels are weighted to reflect human perceptions more closely. These "A-weighted" sounds are identified by the symbol dBA. Table 3-5 illustrates common sounds and the measured sound level.

The Final Environmental Impact Statement for Personal Watercraft Rule-Making, 2003, noted that natural ambient sound levels in the recreation area are below 50-dBA.

TABLE 3-5: SOUND LEVEL COMPARISON CHART

<u>Decibels</u>	<u>How it Feels</u>	<u>Equivalent Sounds</u>
140-160	Near permanent damage from short exposure	Large caliber rifles (e.g., .243, 30-06)
130-140	Pain to ears;	.22 caliber weapon
100	Very loud Conversation stops	Air compressor at 20 feet; garbage trucks and city buses. Power lawnmower; diesel truck at 25 feet.
90	Intolerable for phone use	Steady flow of freeway traffic; 10 HP outboard motor; garbage disposal.
80		Muffled jet ski at 50 feet; automatic dishwasher; near drilling rig; vacuum cleaner.
70		Drilling rig at 200 feet; window air conditioner outside at 2 feet.
60	Quiet	Window air conditioner in room; normal conversation.
50	Sleep interference	Quiet home in evening; drilling at 800 feet; bird calls.
40		Library.
30		Soft whisper.
20		In a quiet house at midnight; leaves rustling.

NOTE: Modified from Final Environmental Impact Statement, Miccosukee 3-1 Exploratory Well, Broward County, Florida (U.S. Department of the Interior).

For the average human, a 10-dBA increase in the measured sound level is subjectively perceived as being twice as loud, and a 10-dBA decrease is perceived as half as loud. The decibel change at which the average human would indicate that the sound is just perceptibly louder or perceptibly quieter is 3-dBA. There is generally a 6-dBA reduction in sound level for each doubling of distance from a noise source due to spherical spreading loss (e.g., if the sound level at 25 feet from a boat was 86 dBA, the sound level at 50 feet would be expected to be 80 dBA, at 100 feet 74 dBA, etc.).

3.4.2 Watercraft Noise Levels

The General Management Plan (NPS 1979) divided Glen Canyon NRA into four management zones. The lake surface and the Wahweap project area are located in the Recreation and Resource Utilization Zone and Development Zone, respectively. Noises from PWC and other vessels are consistent with the purpose and management direction of the Recreation and Resource Utilization and Development Zones.

Watercraft-generated noise levels vary from vessel to vessel. To improve the watercraft noise database, the NPS contracted for noise measurements of motorized vessels in 2001 at Glen Canyon NRA (Harris, Miller, Miller, & Hanson, Inc. 2002). The results show that outboard motors and PWC are similar in the noise generated. Noise levels for motorboats measured during that study ranged from 65 to 77 dBA at 25 meters (82 feet). The larger boats, characterized as “V8 ‘muscle’ boats,” had noise levels of 85 to 86 dBA at 25 meters (82 feet). Maximum PWC noise levels at 25 meters (82 feet) ranged between 68 to 76 dBA.

Draft

Personal watercraft, unlike motorboats, are highly maneuverable and can be used for stunts and acrobatics, often resulting in quickly varying noise levels due to changes in acceleration and exposure of the jet exhaust when crossing waves. The frequent change in pitch and noise levels, especially if operated closer to land, can make the noise from PWC more noticeable to human ears.

Noise limits established by the NPS require vessels to operate at less than 82 dB at 82 feet from the vessel.

3.5 HABITAT AND WILDLIFE

Wahweap is located in the Colorado Plateau in the desert scrub ecozone. Wildlife habitat in the Wahweap area is represented by the black brush community, areas of bare rock, and in depressions and drainages where sand accumulates, a sand-shrub/grassland community. All these communities are commonly found on the Colorado Plateau. Except for the vicinity of developed areas, such as campgrounds and buildings, trees are non-existent.

Wildlife in the Wahweap area is generally sparse due to encroachment by development and extensive human use. The three principal breeding birds found in the area are the black-throated sparrow, sage sparrow and horned lark. Other less common species that nest in blackbrush habitat in the vicinity of the Wahweap Marina include burrowing owl, house finch, mourning dove and loggerhead shrike. Species that forage in blackbrush but generally nest elsewhere include common raven, Say's phoebe, red-tailed hawk, prairie falcon, turkey vulture and golden eagle (NPS 2002b). Water birds associated with aquatic habitats include coots, grebes and a variety of ducks. During the early spring, waterfowl and shorebirds tend to congregate around the Wahweap bays. Higher concentrations of bird species also occur in saltceder stands in the Wahweap Bay area based on a 1990 NPS survey.

Mammals common to the desert scrub of the Colorado Plateau are the Great Basin pocket mouse, Ord's kangaroo mouse, white-footed deer mouse, black-tailed jackrabbit and desert cottontail (Hoffmeister 1986). Coyote and desert bighorn sheep are known to frequent the region.

Reptiles and amphibians in the region include whiptail lizards, collared lizard, desert horned lizard and chuckwalla. Snakes in the area include the gopher snake, western rattlesnake and various racers.

The fish of Lake Powell are represented by striped bass, largemouth bass, walleye pike, northern pike, channel catfish, bluegill, shad and carp. Many of these species provide sport fishing opportunities for anglers.

Due to the amount of human activity and past disturbance, very little natural habitat for small mammal and bird species remains in or near the immediately development areas at Wahweap.

3.6 SOILS AND GEOLOGY

Soils of the project area are derived from the local geologic formations, which are predominantly sandstones, siltstones, and other depositional materials. The prevailing soil mapping unit in the area is the Sheppard-rock outcrop association. This association consists of loamy fine sand to sandy reddish soils that can range in depths of 60 inches or more. The area comprises 50 percent Sheppard soils and dunelands; 30 percent Rock outcrop; and the remaining 20 percent a mix of Palma, Moenkopie and alluvial soils and rough broken land and badlands. As shown in figure 3.2, there are a number of high slope areas in the study area. Slopes range from flat (0 percent) to 16 percent. There are numerous areas with rock outcrops at the surface or with soil deposits only a few inches thick. Water erosion potential is low and wind erosion potential is high. There are no prime or unique farmland soils associated with the project area (NPS 1998a).

Three geological units occur within the study area. They include clastic sedimentary rocks of the Carmel Formation and Entrada Sandstone that were deposited in the Jurassic Period (190 to 135 million years ago), and unconsolidated dune deposits of Holocene to Recent age (less than 2 million years ago) (NPS 2002b).

3.7 THREATENED, ENDANGERED OR SPECIAL CONCERN SPECIES

Wahweap Marina and the immediate surrounding area does not provide habitat for any federally listed or proposed for listing endangered or threatened species. Although the recreation area is known to offer suitable habitat conditions for some listed species, none of these areas are known to be used by endangered or threatened species nor would any designated critical habitats be affected by project activities or structures. The bald eagle, peregrine falcon and California condor are known to occasionally frequent the general area as they move between other locations. The razorback sucker and Colorado pikeminnow are known to occur in the lake's headwater interface with tributary rivers. None of these species are known to occur in or near the project area (NPS 2002b). A search of the USFWS Arizona Ecological Services Field Office Website for Coconino County, Arizona species that are listed, proposed for listing, candidates for listing or have conservation agreements are presented in appendix D.

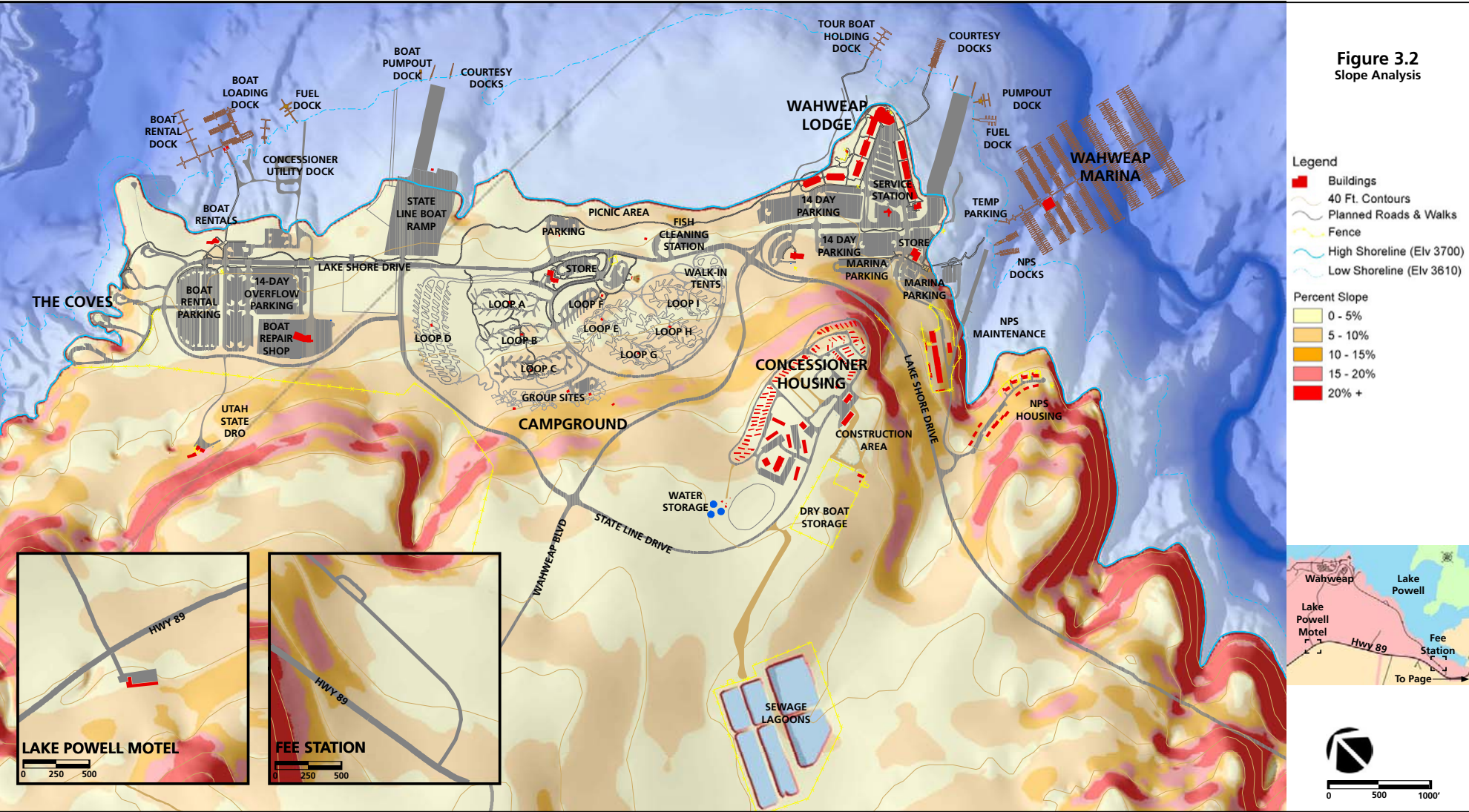
There are three Arizona special status wildlife species of concerns in Glen Canyon NRA. They include the burrowing owl, golden eagle and loggerhead shrike.

Burrowing owls have shown substantial decline in both Arizona and Utah in recent decades. They have become rare in Glen Canyon NRA and the region for unknown reasons. A pair has been recorded in the past to the south and west of the wastewater treatment system. Burrowing owls are generally tolerant of human activities, as long as their burrows remain undisturbed and general habitat conditions around the burrow remain suitable as foraging areas for insects and small mammals. Grasshoppers typically comprise over 80 percent of its summer diet.

Figure 3.2 – Slope Analysis



Figure 3.2
Slope Analysis



Golden eagles have declined sharply in recent years in many areas of the western United States. Currently, the U.S. Fish and Wildlife Service is planning a 5-year survey program to determine the size and extent of the eagle population in western states. The Wahweap area is used by a pair of golden eagles from Castle Rock as foraging habitat. Golden eagle pairs typically maintain a territory and foraging areas that range from 8 to 10 square miles (5,120 to 6,400 acres). Foraging areas within a pair's territory shift annually and seasonally with changes in prey availability. The most sensitive aspect of the golden eagle's life history is loss or alteration of its nest site. No active golden eagle nest sites are known to occur in the project area.

The loggerhead shrike has also declined in some portions of the United States in recent decades. One or more pairs inhabit the Wahweap area. This species is typically associated with mixed grass (vegetation ranging from 4 to 8 inches tall) and shrub complexes. Nest trees or shrubs are important habitat components and require protection. Depending on habitat quality, nesting territories range in size from 15 to 100 acres. Over-grazed rangeland, rangeland conversion to agriculture and urbanization are primary reasons for species decline. Grasshoppers typically comprise more than 70 percent of the summer diet. Recommended species protection measures include preserving fence lines, nest trees or shrubs, and hedgerows and windbreaks in the vicinity of nest trees (NPS 2002b).

Although the recreation area is known to offer suitable habitat conditions for other listed or sensitive wildlife species, none of these species are known to frequent or regularly occur in the areas to be affected by proposed project facilities or activities. Bald eagles and California condor are known to occasionally frequent the general area as they pass through, moving between other locations. The razorback sucker and Colorado pikeminnow are both riverine-affiliated species and are known to occur in the lake's headwater interface with tributary rivers. Neither of these fish species is known to occur in the main body of the reservoir near the project area (NPS 2002b).

Recently, the California condor has been observed frequenting construction sites at several national park units in the southwest United States. Such occurrences have increased as this species expands its radius of mobility. It has been noted that construction or other disturbance activities tend to attract its temporary attention. If this event should occur during the construction of the Wahweap facilities associated with any alternative, the NPS would immediately notify the local office of the U.S. Fish and Wildlife Service and take appropriate actions to either avoid or minimize adverse effects to the condor (NPS 2002b).

3.8 VEGETATION

The Wahweap area supports several plant communities: the blackbrush community, sand-shrub/grassland community and vegetation that grows along the shoreline and drawdown reaches. Over the years, the overall project area has seen intense development and high visitation. Areas of previous disturbance are present; some of these are currently being restored.

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Blackbrush (*Coleogyne ramosissima*) is an abundant shrub that can form large monotypic expanses on the Colorado Plateau. It is the most widespread plant community in Glen Canyon NRA.

Within the blackbrush community, in depressions and drainages where sand accumulates, a sand-shrub/grassland community develops. Principal species include sand sage (*Artemisia filifolia*), Mormon-tea (*Ephedra viridis*), vancleavea (*Vancleavea stylosa*), four-wing saltbush (*Atriplex canescens*), galleta (*Hilaria jamesii*) and Indian ricegrass (*Oryzopsis hymenoides*). The composition of this community varies depending on past grazing history. Where grazing has been heavy and prolonged, sand sage, Mormon-tea and vancleavea become more common and other species, including yucca (*Yucca* spp.) and snakeweed (*Gutierrezia* spp.) invade. Where grazing has been light, grasses and four-wing saltbush tend to be more common.

The waterline of Lake Powell can fluctuate 50 feet vertically and 1,000 feet horizontally during a typical water year creating an area where shoreline vegetation can become established. Common shoreline vegetation includes saltcedar or tamarisk (*Tamarix ramosissima*), seepwillow (*Baccharis salicifolia*) and numerous weed species that grow along the lake shoreline, such as Russian thistle (*Salsola kali*).

Submerged aquatic beds occur in limited areas. Wetlands do not occur at Wahweap.

Disturbed soil areas in the recreation area and elsewhere in the region create a need to address the matter of noxious weed and exotic plant species invading new locations, once established native plant assemblages are altered by construction or other land use activities that remove or degrade stable native plant assemblages. This problem is becoming increasingly more severe and requires constant resource management attention on both upland sites, wetland, riparian and lakeshore areas. A list of noxious weeds common to northern Arizona and potentially found in the Wahweap is listed below.

- Yellow Starthistle (*Centaurea solstitialis*)
- Diffuse Knapweed (*Centaurea diffusa*)
- Knapweed (*Centaurea maculata*)
- Mediterranean Sage (*Salvia aethiopsis*)
- Musk Thistle (*Carduus nutans*)
- Scotch Thistle (*Onopordum acanthium*)
- Camelthorn (*Alhagi pseudoalhage*)
- Source: Northern Arizona Weed Council found on the Internet at (<http://www.infomagic.net/~tnc/weedcouncil/resources.htm>)

Additional weeds seen in the Wahweap area are Tamarisk (*Tamarix ramosissima*), Ravenna grass (*Saccharum revaennae*), and Russian olive (*Elaeagnus angustifolia*).

3.9 VISITOR USE AND EXPERIENCE

Between 1.4 and 1.8 million people visit the Wahweap Marina annually. While the number of visitors has been slowly increasing over the last 20 years, visitation records from the last five years indicate a relatively constant number of visitors. Historical visitation data was used to project the anticipated number of visitors to the Wahweap Marina in the year 2010. By the year 2010, annual visitation at the Wahweap Marina is projected to be 2.7 million.

Visitors to Lake Powell are primarily interested in water-based activities. Swimming (83 percent of visitors), motor boating (77 percent) and camping at shoreline camp sites (61 percent) are the most popular activities. Boating use and many other activities are concentrated in areas associated with entry ports and marinas, such as Bullfrog, Wahweap, Hite and Halls Crossing (NPS 2002a).

Overall, boating carrying capacity has been established at Lake Powell to protect water quality, natural resources, and visitor safety and experience. Peak boat use occurs on weekends in peak months where launches can number as high as 684 per day. The zone that Wahweap is located within, which also includes Antelope Point and Lone Rock, has a capacity of 1,110 boat launches/day. Of this total, 870 boat launches/day are allocated to Wahweap and 240 launches/day to Antelope Point. The overall boating carrying capacity for the Wahweap area could be increased to 1,358 launches/day through the implementation of additional measures to protect water quality and other resources. Based on boat pass sales in 2001 and 2002, launches per day on peak holiday weekends averaged 500 launches a day. The busiest weekend according to boat pass sales was July 4.

Other water sport activities available at Wahweap and throughout Glen Canyon NRA are kayaking, boat tours, sailing, water skiing and fishing. The concessioner, ARAMARK, has 175 houseboats, 150 small boats and 35 PWC available to rent. Nine tour boats are also available to the public.

Opportunities exist for hiking in the surrounding canyon areas. Sites that have archeological and cultural significance are also accessible. Visitors can enjoy a range of camping opportunities, from remote and undeveloped campsites to fully developed campgrounds where 120 RV sites and 235 sites for tents are available. The 25-room Lake Powell Motel has been historically available, but not operated for the past three seasons. The 350-room Wahweap Lodge is the primary lodging facility.

3.10 VISUAL RESOURCES

Visual resources include the natural and man-made physical features that give a particular landscape its character and quality. Landscapes are not static, but are always undergoing change as a result of natural environmental processes or external modification. Underlying the character and condition of a landscape are the geologic conditions and processes under which it has evolved. These factors, in combination with climate, influence the type and condition of soils and vegetative cover that have developed, the types and abundance of wildlife that inhabit the land, and the uses people make of it. The resulting landscape

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character, together with our individual experience base and expectations, determine the meaning we attach to the landscape.

The Wahweap Marina contains strong natural and natural-appearing elements as well as visually evident modifications. Impressions of the appropriateness of these modifications are strongly influenced by the character, extent, placement, condition, maintenance and order of these modifications, and the level of landscape disturbance that remains in evidence from their construction and use over time. Together, these factors influence the dominance and contrast of the modifications with the broader, surrounding landscape in ways that can be reliably assessed.

To evaluate these elements, an assessment was done from locations most commonly visited – from which the marina is most commonly viewed. These locations are referred to as key observation points. While the assessment from these viewpoints is a consideration addressed in chapter 4.0, the identification of key observation points is done as part of the existing environment (chapter 3.0) documentation. Appendix E also shows an initial visibility analysis from primary roads, which helps illustrate potential key viewsheds. This assessment also accounts for the management prescription of the land and would vary according to the degree to which visual values are to be protected. For example, if the management standard is for retaining a strong natural dominance, it would take relatively little modification to create a negative effect. If the management standard were for a co-equal dominance of natural and man-made influences, the same minor level of modification would not be seen as a visual impact from a regulatory standpoint.

The conditions that are addressed in this section include:

- Identification of key observation points (key locations from where the landscape is seen).
- Documentation of the natural and man-made features present (Landscape Character and Quality).
- Identification of the management prescription/standards established for visual resources of these lands (Management Objectives).

3.10.1 Key Observation Points

Based on field investigations and selected computer terrain modeling studies, it was determined that the marina area is seen from five general locations. These are:



- US Highway 89
- Wahweap Boulevard (a primary entrance road)
- Lakeshore Drive (a primary entrance road)
- various locations within the marina development proper
- Lake Powell



In each case, the most critical viewpoint or viewpoints were selected as the places to assess visual effects as discussed in chapter 4.0.

3.10.2 Landscape Character and Quality

The lands approaching and within the marina area were visited on various occasions and the conditions of the land and man-made elements documented. The setting of the marina is dramatic in terms of the natural and natural-appearing landscape elements. This includes the striking landforms (natural) and the "lake" (natural appearing element). Together, they are a compelling image that one never tires of viewing.



As one approaches the marina from any vantage point, and even from many locations within the marina complex, views and attention are strongly drawn toward these dominant natural features.

There are, however, a number of man-made features associated with the marina that compete to various degrees with these natural elements, depending on the viewer's location within and approaching the marina complex. Of these, the most notable include the employee housing, the boat storage and construction area. The prominent location of these features on a topographic high point makes them conspicuous as one enters from either Wahweap Boulevard or Lakeshore Drive, and from certain vantage points within the marina complex itself. The visual prominence of these features is accentuated by the non-native vegetation that has been planted there.

The lodge is the most extensive, single man-made feature within the marina. It has a southwestern architectural character that appears to fit well into the context of the site. Building upon this theme are recent and planned additions, which include restrooms, campground facilities and new campground store. These would be positive steps in building a unifying appearance to the marina development. Other development, however, has a more traditional or contemporary appearance, such as the gas station, the rangers office and other more minor structures.

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The marina and campground are notable for the extent and concentration of development. Similarly, the various parking areas are notable for their extent.

Various areas show minor impact to the vegetation or traces of past disturbance that is in various stages of restoration. By and large, these conditions are minor and likely not evident to the average user.

3.10.3 Management Objectives

The scenic resources for the Lake Powell area have been divided into four classes, described below. Criteria used to differentiate between scenic resource classes were established in the General Management Plan (NPS 1979) and include diversity of color, contrast, form and geologic uniqueness.

- Class I areas are identified as outstanding scenery that typically include "deep canyons, unique geologic structures and intricately carved landscapes."
- Class II areas have superior scenery and may contain just a single property characterized by immensity or unique physiographical distinctions.
- Class III areas are interesting but less unique or prominent than Class I or II areas. Nonetheless, they contribute to the interest of the overall scenery.
- Class IV areas are described as unremarkable . Among other characteristics, they can include "flat, monotonous expanses of shrub or pinyon-juniper communities."

Scenery throughout Glen Canyon NRA is generally considered high quality. About 40 percent of the area, which includes the foreground surrounding the Wahweap Marina, is designated as Class III.

3.11 SOCIOECONOMICS

The City of Page is located approximately 6 miles southeast of the Wahweap Marina. The City was founded to provide housing for workers during construction of Glen Canyon Dam. It has evolved into the gateway community for national recreation area facilities near the dam, including the Wahweap Marina. The 2000 census reports the population to be 6,809, an increase from the population of 6,598 recorded in the 1990 census. The growth rate over this 10-year period was 3.2 percent. Tourism and power generation are the largest sources of revenue in Page. The largest employers are Lake Powell Resorts and Marinas (ARAMARK), the Navajo Generating Station, and the Page Unified School District. (NPS 2002a).

The Wahweap Marina and the Arizona portion of Glen Canyon NRA are located in Coconino County. Coconino County encompasses 18,608 square miles, and is the largest county in Arizona and the second largest county in the United States. The county seat is in Flagstaff, about 135 miles south of the Wahweap Marina area. Land ownership within Coconino County is as follows.

- Indian reservations comprise 38 percent of the land. Tribes include the Navajo, Hopi, Paiute, Havasupai and Hualapai.
- The Bureau of Land Management and U.S. Forest Service manage 32 percent of the land.
- Thirteen percent of the land in the county is privately owned.
- The state of Arizona owns 10 percent of the county, including three popular state parks: Red Rock, Riordan and Slide Rock.
- Seven percent of the county consists of public lands that are managed by other agencies, including the NPS. These lands include Glen Canyon NRA, Grand Canyon National Park, Sunset Crater National Monument, Walnut Canyon National Monument and Wupatki National Monument (Arizona Department of Commerce 2003).

The estimated 2001 population for Coconino County is 117,916, which was an increase of 1.4 percent over the previous year. The estimated growth rate for the state of Arizona over that period was 3.4 percent. Approximately 63 percent of county residents are white; 29 percent American Indian or Alaskan native; 11 percent Hispanic; and one percent or less of the population are Asian, Native Hawaiian and other Pacific Islander, Black or African American. General population trends for Coconino County and the state of Arizona are presented in the table 3-6 below.

TABLE 3-6: RECENT POPULATION TRENDS FOR THE STATE OF ARIZONA AND COCONINO COUNTY

	<u>1990</u>	<u>2000</u>	<u>2002</u>
Coconino County	96,591	116,320	125,420
Arizona	3,665,228	5,130,632	5,472,750
SOURCE: State of Arizona 2003			

County per capita income in 1997 was \$18,180. This was 17 percent below the state average of \$22,000. The civilian labor force in 1999 was about 59,100 people. Almost 25 percent of these people worked for local, state or federal government agencies. Unemployment in 1999 was about 6.8 percent (NPS 2002a). Table 3-7 presents estimated employment by sector for Coconino County for 2002.

TABLE 3-7: 2002 EMPLOYMENT BY SECTOR FOR COCONINO COUNTY, ARIZONA

Agriculture	349*
Manufacturing	2,950
Mining and Quarrying	100
Construction	2,550
Transpiration, Communications and Public Utilities	1,625
Trade	14,000
Finance, Insurance and Real Estate	1,375
Services and Miscellaneous	16,100
Government	20,450
Total	59,499
* Agriculture figure from 4 th Quarter, Arizona ES202 Data, Arizona Department of Economic Security in cooperation with the U.S.	

A large amount of sales tax revenue from fuel, boat rental repairs, rental boats and buoy customers is generated in the project area. The portion of the project area located in the State of Utah is subject to a different tax structure than the remainder of the project area.

The community of Page, Arizona has numerous attractions available to visitors and residents, including the John Wesley Powell Memorial Museum and Visitor Information Center, the Carl Hayden Visitor Center at Glen Canyon Dam, the Dine Bi Kaya Museum and the Lake Powell National Golf Course.

3.12 CULTURAL RESOURCES

3.12.1 Archeological Resources

The national recreation area contains evidence of human occupation during the Paleoindian Period, dating back to about 11,500 years before present. Later, Archaic peoples moved across the landscape in a seasonal pattern as they hunted, gathered foodstuffs and collected specialized subsistence items. During Pueblo II times, the lowland canyon systems were heavily settled, and regional sites include small storage areas and kivas. Parts of the canyonlands region have evidence of frequent use for quarrying, hunting, and other subsistence activities.

The general abandonment of the region coincides with that of the northern Ancestral Pueblo areas in the late A.D. 1200s. Decreases in population in the canyonlands began slightly earlier than in areas further north. These population shifts may have been caused by environmental changes or proto-historic use of the area by Navajo and other Indian groups (NPS 1979).

Eight prehistoric archeological sites within the project area could be affected: AZ C:2:16; AZ C:2:17; AZ C:2:18; AZ C:2:19; AZ C:3:05; AZ C:2:23; AZ C:2:05; and 42 KA02008. The park and the Arizona State Historic Preservation Office are consulting on eligibility of those resources.

A level 1 survey conducted by park staff in July 2003 found no evidence of archeological resources in the area south of the employee housing

3.12.2 Historic Resources

The recreation area's historic resources include historic structures, trails, cultural landscapes and archeological sites. Within the project area, the Wahweap Trail Village Cabins are considered Eligible for listing on the National Register of Historic Places under Criterion A, based on a determination of eligibility completed for the park 2003. Built in 1963, the Lake Powell Lodge (known as the Lake Powell Motel) is located at the junction of Highway 89 and the turn off to Wahweap. The park and the Arizona State Historic Preservation Office are in consultation regarding possible eligibility of the motel. There are no National Historic Landmark properties within the area of potential effect.

3.12.3 Cultural Landscapes

Cultural landscapes represent a complex of cultural resources within a discrete geographic area, and reflect human adaptation and resource use associated with a historic activity, event or person. Cultural landscapes may be expressed in a variety of ways, such as patterns of settlement or land use, systems of circulation and transportation, buildings and structures, or parks and open spaces. The NPS recognizes four categories: historic designated landscapes, historic vernacular landscapes, ethnographic landscapes and historic sites. No cultural landscapes have thus far been identified within the project area.

3.12.4 Ethnographic Resources

Many of the recreation area resources are considered sacred by Native Americans. These particularly include the Colorado and San Juan Rivers, their side canyons, and landscapes in which they occur. Five contemporary Native American tribes are associated with the recreation area, including the Hopi, Kaibab Paiute, Navajo, San Juan Southern Paiute and Ute Mountain Ute. Glen Canyon NRA also works with several other tribes or bands because of past environmental documents and ethnographic research. These include the Kanosh and Koosharem Bands of the Paiute Indian Tribe of Utah. The Havasupai and Hualapai claim affiliation to the Colorado River below the dam. Each tribe has its own account of its history and relationships with other tribes and groups that can be only partially supplemented by archeological research. (NPS 1998b).

An Ethnographic Overview and Assessment of Glen Canyon National Recreation Area and the Rainbow Bridge National Monument prepared for the park by Northern Arizona University in 1992 recommended additional ethnographic and traditional use studies to identify and recommend tribal use. Since 1992 several archeological studies, including the *Wahweap-Stateline Development Area Inventory and Evaluation by the Midwest Archeological Center* (1996), have also been completed and add to the body knowledge on ethnographic resources.

3.12.5 Past Cultural Resource Investigations

Only about two percent of Glen Canyon NRA has been surveyed for cultural resources. Most of the surveys have been in canyon areas. A partial listing of past archeological investigations within Glen Canyon NRA at 20 shoreline areas, which are accessible by automobile, is included in the *Environmental Assessment and Management/Development Concept Plans for Lake Powell's Accessible Shorelines* (NPS 1988). Ethnographic studies (NPS, Sucec, 1996a and 1996b) provide information used to support recreation area planning, research, resource management and interpretive programs.

Within the Wahweap project area, a number of cultural resource studies have been completed including Dominques and Vawser (1996), Goetze (1995), and Tipps (1979, 1987). The study by Dominques and Vawser (1996), completed in support of the proposed Wahweap Stateline Development project, also provides information for this Wahweap DCP.

3.13 PARK OPERATIONS

The Superintendent of Glen Canyon NRA is responsible for the full scope of managing the area, its staff and residents, all of its programs, and its regulations with persons, agencies and organizations interested in the national recreation area.

National recreation area staff provide the full scope of functions and activities to accomplish management objectives and meet requirements of law enforcement, emergency services, public health and safety, science, resource protection and management, visitor services, interpretation and education, community services, utilities, housing, fee collection and management support.

Operations within the project area include routine facility maintenance and repair, utility corridor treatments to maintain accessibility, maintenance of existing infrastructure components, and development of new facilities (NPS 2002b).

National recreation area staff manage the housing in conjunction with the concessioner. Current direction is to provide only the minimum number of housing units necessary to support the mission of the National Park Service. To comply with this policy, NPS is currently evaluating the existing housing stock and providing recommendations for the appropriate amount and types of housing.

3.14 PUBLIC SAFETY

Public safety facilities in the area are located in the City of Page and in the Wahweap area. The District Ranger's Office (DRO) at Wahweap provides law enforcement and emergency response, fire protection and visitor information. Jurisdiction for handling public safety issues (i.e., law enforcement) generally lies with the NPS Rangers though other law enforcement entities may also respond. Page facilities include one acute care hospital, three medical clinics, one mental health clinic and three dental clinics. The fire and police departments are fully staffed and operated by the City of Page. .

Boating safety requirements are enforced by several agencies, including the National Park Service, U.S. Coast Guard, Coconino County, Arizona Game and Fish Department, Utah State Parks and Recreation, and the Utah Department of Natural Resources. Glen Canyon NRA normally employs between 25 and 30 permanent rangers who patrol and enforce boating laws. The distribution of enforcement staff is based on levels of visitor use and the frequency of problems. Almost half of the law enforcement staff is assigned to the Wahweap Subdistrict, which accounts for about a quarter of the use by watercraft at Lake Powell (NPS 2002b).

Typically during the summer months, approximately 17 NPS law enforcement officers are assigned to the Wahweap area. NPS rangers are responsible for ensuring the safety of visitors and for protecting recreation area resources on both land and water. This presents a challenge because most visitor activity is water-based, while about 85 percent of the recreation area is dry land. Land-based areas of concentrated visitor activity, such as the boat launches and campgrounds, require disproportionate commitments of NPS enforcement staff (NPS 2002a).

3.15 TRANSPORTATION AND TRAFFIC

The Wahweap area can be accessed from two entrances by traveling north from Page, Arizona on Highway 89. A South entrance to Wahweap is located approximately one-half mile west of the bridge crossing the Colorado River at Glen Canyon Dam. A North entrance is located approximately 5 miles north of the bridge at the Colorado River and Gen Canyon Dam. The Wahweap area has a well developed road system that provides an ample, line of sight to oncoming traffic (NPS 2002c). In the peak months of June, July and August, it is not uncommon for over 100,00 visitors per month to visit Wahweap (table 3-8).

Currently parking at Wahweap marina is fully utilized and congestion is present. On peak days, informal parking occurs along the primary roadways. Parking at the Stateline Marina is underutilized. Very few suitable locations exist for the construction of new parking.

The NPS is currently examining the feasibility of enhancing the current traffic flow through a Wahweap area shuttle system, especially during peak seasons. A shuttle system would provide benefits by reducing the number of parking spaces needed around high traffic areas, such as the marina and launch ramps. It would also improve traffic circulation and promote increased use of remote parking areas, such as parking at Stateline, thus decreasing the need to construct parking spaces in undeveloped areas around the marina and lodge facilities (NPS 1998a).

TABLE 3-8: WAHWEAP MARINA VISITOR USE DURING PEAK MONTHS (FROM: NPS PUBLIC USE STATISTICS OFFICE))

<u>Year</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
2000	175,283	296,691	344,738	301,514	165,638
2001	169,710	264,867	302,764	289,245	146,339
2002	148,720	232,523	272,278	240,119	136,500
2003	136,340	-	-	-	-

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4.0 Environmental Consequences

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4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This section provides a summary of the environmental effects of each of the three alternatives. A general comparison of these effects was previously described in table 2.2. The area impacted or restored for relevant project elements is summarized in appendix F.

4.1.1 Methodology

For each impact topic, the analysis includes a description of the affected environment (chapter 3) and an analysis of the environmental consequences using the methods and terms presented in this section. The impact analysis involved the following steps.



- Identify the area that could be affected.
- Compare the area of potential effect with the resources that are present as compared to the baseline (alternative A).
- Identify the intensity, context, duration (short or long term) and type (direct or indirect) of effect, both as a result of this action and from a cumulative effects perspective.

Assumptions:

Short-term impacts: Those occurring from the development and operation alternative elements in the immediate future (disturbance/construction period and shortly thereafter).

Long-term impacts: Those occurring from the development and operation of alternative elements over several seasons of use.

Direct impacts: Those occurring as a result of the construction and operations of alternative elements.

Indirect impacts: Those occurring from the development and operation of alternative elements that have a secondary effect of altering a resource or condition.

Cumulative impacts: Discussed in section 4.1.2.

- Identify whether effects would be beneficial or adverse.

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- Identify mitigation measures that may be employed to offset potential adverse impacts. These are listed in section 2.8.

The impact analyses were based on professional judgment using information provided by park staff, relevant references and technical literature, and subject matter experts. Impact thresholds are described within each topic below. Threshold values were developed based on federal and state standards.

4.1.2 Cumulative Effects Analysis Method

The Council on Environmental Quality (CEQ 1978) regulations for implementing the National Environmental Policy Act requires assessment of cumulative effects in the decision-making process for federal projects. Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects are considered for both the no-action and proposed action alternatives.

Cumulative effects were determined by combining the effects of the alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, ongoing, or reasonably foreseeable future actions at the Wahweap Development, within Glen Canyon National Recreation Area, and in the surrounding region. Other actions that have the potential to have a cumulative effect in conjunction with alternative elements include the following:

- Potential future construction of the Antelope Point Marina Resort and Development Project. This facility would be located on Lake Powell about four air miles southeast of the Wahweap Marina. It would include a floating marina village and boat docks, dry storage for boats, campground, RV park, resort hotel and cultural center, optional employee housing, and supporting infrastructure.
- The National Park Service (NPS) will be improving facilities at other sites, including Hite and Bullfrog. Improvements include new housing, restrooms, parking, and campgrounds. These improvement projects would result in localized and primarily beneficial impacts on various resources, but may increase overall visitation to the NRA. Boating capacity is already governed by the Carrying Capacity of Lake Powell (NPS 1987).
- The NPS is improving the existing wastewater treatment system at Wahweap. This project is necessary to bring the current wastewater treatment system into compliance with Arizona Department of Environmental Quality (ADEQ) and Environmental Protection Agency (EPA) requirements. In order to meet these regulations, the NPS will be piping wastewater to Page, Arizona for treatment and disposal. This would reduce current adverse impacts on water quality and result in long-term, beneficial impacts on surface-water quality of Lake Powell, particularly in the areas near Wahweap.

- A housing master plan will be developed at Wahweap. This, in conjunction with the NPS Housing Management Handbook, 1997 and future Lakewide Housing Master Plan, will provide addition housing guidance for the NRA.
- Ongoing population increases in the City of Page. Census Bureau data indicate that for the decade between 1990 and 2000, the city's population grew at a total rate of approximately 3 percent.
- Future developments in the City of Page, including additional conference facilities and housing developments, may provide other alternatives to visitors and concessioner employees. Decisions made within the NRA may also influence the market demand for these facilities.

4.1.3 Impairment Analysis Method

The *National Park Service Management Policies* (NPS 2001a) require analysis of potential effects to determine whether or not actions would impair park resources or values.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. The park's enabling legislation, as amended, further mandates resource protection. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values.

These laws give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.



Impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. Impairment may result from NPS activities in managing the park, from visitor activities or from activities undertaken by concessionaires, contractors and others operating in the park. Impairment of park resources can also occur from activities occurring outside park boundaries. An impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

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- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park
- identified as a goal in the park's general management plan or other relevant NPS planning documents

A determination on impairment is included in the Impact Analysis section for all impact topics relating to park resources and values.

4.1.4 Criteria And Thresholds For Impact Analysis

The following sections of chapter 4.0 provide a description of the related laws, regulations and policies for each impact topic; the methodology and thresholds used in the impact analysis; and a description of the predicted impacts for each alternative.

4.2 WATER QUALITY

4.2.1 Regulation and Policy

The Clean Water Act, and supporting criteria and standards promulgated by the EPA, the Utah Department of Environmental Protection (UDEP), and Arizona Department of Environmental Quality (ADEQ) are applicable at Glen Canyon NRA and are used to protect the beneficial uses of water quality, including human health, health of the aquatic ecosystem and recreational use.

A primary means for protecting water quality under the Clean Water Act is the establishment, implementation and enforcement of water quality standards. Generally, the federal government has delegated the development of standards to the individual states subject to EPA approval. Water quality standards consist of three components: (1) the designated beneficial uses of a water body, such as aquatic life, cold water fishery or body contact recreation (i.e., swimming or wading); (2) the numerical or narrative criteria that define the limits of physical, chemical and biological characteristics of water that are sufficient to protect the beneficial uses; and (3) an anti-degradation provision to protect the existing uses and quality of water.

Water quality criteria developed to protect specific uses are updated periodically by the EPA. New and revised criteria are published in the *Federal Register*, and summarized periodically in Quality Criteria for Water (U.S. EPA 1986). Quality Criteria for Water, also known as "the Gold Book," recommends criteria for a state's Water Quality Standards. The criteria are almost always adopted by states as a portion of their standards, and they represent the "minimum" level of protection afforded to the water bodies of a state. Arizona's anti-degradation policy has three tiers for maintaining and protecting various levels of water quality. Tier 1 provides the base level of protection that must be applied to a water body. The

Tier 1 designation applies to waters that do not meet fishable/swimmable levels. If the water quality in a water body already exceeds the minimum requirements for the protection of the designated uses (Tier 2), then the existing water quality must be maintained. The third tier provides protection for the state's highest quality waters; no degradation of Tier 3 waters is allowed. Lake Powell is a Tier 2 water body.

The State of Utah anti-degradation policy establishes a plan to maintain and improve water quality, but also allows some reduction in water quality to support vital economic activities. Lake Powell is not afforded any special protection under this policy.

Water quality standards are primarily obtained by controlling the pollutants permitted in point source discharges of pollutants into receiving waters through Clean Water Act Section 402 National Pollutant Discharge Elimination System (NPDES) permits, the implementation of best management practices for non-point sources of pollution, and the implementation of Clean Water Act Section 303d, total maximum daily loads (TMDLs), on water bodies that have chronic and persistent violations of water quality standards. The objective of a TMDL is to allocate allowable pollutant loads among different point and non-point sources of pollution.

Maximum contaminant levels for drinking water are developed under the Safe Drinking Water Act. The EPA periodically updates these National Primary Drinking Water Regulations; states have primary enforcement responsibility. New and revised standards are published in the Federal Register. These standards are applicable to finished drinking water that has undergone treatment processes.

Current laws and policies require that the following conditions be achieved in Glen Canyon NRA for water quality.

Desired Conditions	Sources
Water quality will be perpetuated as integral components of national recreation area aquatic and terrestrial ecosystems.	Clean Water Act. Executive Order 11514. <i>NPS Management Policies.</i>
The quality of national recreation area surface water and groundwater resources will be determined. Whenever possible, the pollution of waters by human activities occurring within and outside of the national recreation area will be avoided.	Clean Water Act. Executive Order 12088. <i>NPS Management Policies.</i>

4.2.2 Methodology

The best available information from the most recent literature was used to develop the impact section. Dilution is also a consideration. The volume of water in Lake Powell is 27 million acre-feet at full pool. Impacts can be evaluated based on the potential for dilution lake wide and in coves where use is concentrated. Section 304(a)(1) of the Clean Water Act requires the EPA to develop and publish criteria for water quality accurately reflecting the

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latest scientific knowledge. Water quality criteria developed under section 304(a) are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects. If no criteria are listed for a pollutant, the EPA does not have any national recommended water quality criteria.

The following impact thresholds were established in order to describe the relative changes in water quality (both overall, localized, short, long-term, cumulatively, adverse and beneficial), under the various management alternatives, when compared to baseline conditions. Impacts were considered for areas up to 3 miles from Wahweap.

Negligible. Impacts would not be detectable. Water quality parameters would be well below all water quality standards for the designated use. Both quality and flows would be within historical ambient and variability conditions.

Minor. Impacts would be detectable, but water quality parameters would be well below all water quality standards for the designated use. Both quality and flows would be within the range of ambient conditions, but measurable changes from historical norms would occur. State water quality anti-degradation policy would not be violated.

Moderate. Changes to water quality or flows would be readily apparent, but water quality parameters would be below all water quality standards for the designated use. Water quality or flows would be outside of the range of ambient conditions. Mitigation would probably be necessary to offset adverse effects and would likely be successful. State water quality anti-degradation policy would not be violated.

Major. Changes to water quality or flows would be readily apparent, and some water quality parameters periodically would be approached, equaled, or exceeded. Flows would be outside of the range of ambient conditions, and could include a complete loss of water in some areas or flooding in other areas. Extensive mitigation would be needed to offset adverse effects, and its success would not be assured. State water quality anti-degradation policy may be violated.

Impairment. Chemical or physical changes to water quality would be detectable and would be substantially and frequently altered from the historical baseline or desired water quality conditions and/or water quality standards. The impacts would involve deterioration of the recreation area's water quality and aquatic resources over the long term, to the point that the recreation area's purpose could not be fulfilled, or resources could not be experienced and enjoyed by future generations.

The analysis identified potential effects on water quality. Information on water resources in the area was gathered from recent documents produced for Glen Canyon NRA facilities, including the Wahweap wastewater treatment system upgrade, Antelope Point and the personal watercraft draft environmental impact analyses. Actions under the various alternatives were evaluated based on the current conditions. Impacts were assessed based on professional judgment and past experience with similar projects.

4.2.3 Alternative A (No-Action Alternative)

Impact Analysis – Under the no-action alternative, impacts on surface water quality would occur as a result of continued vehicle use and continuing use of watercraft.

As with the other alternatives, alternative A would result in continued use of watercraft. These watercraft would emit mixtures of hydrocarbons into lake waters. As described in Chapter 3, water quality in Lake Powell meets all applicable standards. The anticipated concentrations of watercraft emissions would not be expected to reach or exceed water quality standards or regulatory criteria because the large size of Lake Powell and water currents would dilute any pollutant concentrations. Furthermore, EPA is requiring the phasing in of less polluting marine engines over the next decade (EPA 1996, 1997). The EPA estimates hydrocarbon emissions will be reduced as follows (EPA 1996, 1997):

- In 2010, overall emissions from watercraft use would be reduced by 52 percent compared to emissions in 1996.
- In 2030, overall emissions from watercraft use would be reduced by 75 percent.

Future emissions by personal watercraft at Glen Canyon National Recreation Area are predicted to be as follows in the PWCFEIS (NPS 2003c):

- In 2005, overall emissions from watercraft use would be reduced by 25 percent compared to emissions in 1996.
- In 2010, overall emissions from watercraft use would be reduced by 50 percent.

Given these emission reductions and the fact that neither hydrocarbons nor benzene have not been observed at concentrations above drinking water standards (NPS 2003c) indicates that impacts on surface-water quality from watercraft use would be long term, negligible, and adverse.

Cumulative Impacts – The area of influence for the analysis of cumulative effects is defined as the immediate Wahweap Marina area. Cumulative impacts that would occur under alternative A would be long term, negligible and adverse on surface-water quality, and would result from continued use of the area by the public and the presence of motorized vehicles. Negligible-to-minor, long-term and beneficial impacts on surface-water quality would be expected from the NPS initiative to staff pump-outs and continued implementation of the Lake Powell Clean Water Program. Major improvements to the Antelope Point Marina and Wahweap, include measures such as catch basins to control surface water runoff. Upgrades to the Wahweap wastewater treatment system would be anticipated to result in long-term, moderate beneficial impacts on water quality, by bringing the system into compliance with state and federal regulations. Overall impacts on water quality would likely be long term and beneficial.



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Conclusion – Long-term, negligible, adverse impacts on surface-water quality would occur from continued recreational uses, including potential leaks and spillage of boat fuels and emissions from watercraft operation. No violations of water quality standards would be expected. No impairment of park resources would result from implementation of this alternative.

4.2.4 Alternative B

Impact Analysis – Construction of alternative B would result in temporary surface impacts in areas of construction at the Visitor contact station, dry boat storage and boat launch ramp. Short-term, low-level increases in sedimentation rates along the Lake Powell shoreline would result from erosion of disturbed areas, which are estimated to encompass approximately 4 acres. Additional information on acres disturbed by each of the alternatives is presented in appendix F. Sediment accumulation would be expected to be negligible during construction, particularly if surface stabilization techniques are employed effectively. Erosion of soil into lake waters would be expected to decline to current background levels after disturbed areas have been paved or rehabilitated. Approximately 24 acres of area now designated as concessioner housing would be restored to native vegetation.

A Construction General Permit under the National Pollutant Discharge Elimination System would be required, which would outline specific best management practices that would be implemented to reduce any potential storm water runoff. Therefore, these localized impacts would be short term, negligible, and adverse.

Management of human waste in the area is addressed through provision of onland restroom facilities. Improvements to the Wahweap wastewater treatment system are anticipated to accommodate additional demands in the area.

Boat pump-out stations at the marina would be a potential source of contamination by sewage waste from boat holding tanks. Based on the protective features included in design of the boat pump-out stations, impacts on water quality would be long term, negligible to minor, and adverse.

Alternative B would result in continued use of watercraft in the waters of Lake Powell at Wahweap. For the reasons discussed under alternative A, impacts on surface-water quality from watercraft would be long term, negligible, and adverse.

Cumulative Impacts – Cumulative impacts could occur as a result of the development of Antelope Point Marina and the potential for increased boating use in the Wahweap vicinity. This could result in long-term, minor, and adverse impacts to water quality. However, the long-term and beneficial impacts on surface-water quality that would be expected from the NPS initiative to staff pump-outs, continued implementation of the Lake Powell Clean Water Program and phasing out of more polluting twp-stroke marine engines are likely to offset adverse impacts.

Conclusion – Alternative B would result in short-term, negligible, adverse impacts on water quality from runoff during construction. Long-term, negligible, adverse impacts on surface water quality would occur from continued recreational uses, including potential leaks and spillage of boat fuels and continued use of watercraft. No violations of water quality standards would be expected. No impairment of park resources would result from implementation of this alternative.

4.2.5 Alternative C (Preferred Alternative)

Impact Analysis – Impacts to water quality under alternative C would be similar to those of alternative B. Visitor use and watercraft use is expected to be similar to that of alternative B.

Cumulative Impacts – Cumulative effects to water quality would be similar to those described in alternative B.

Conclusion – Alternative C would result in short-term, negligible, adverse impacts on water quality from runoff during construction. Approximately 7 acres would be disturbed by construction activities, while an additional 18 acres of land previously disturbed or occupied by existing facilities would be restored to a more natural condition. Long-term, negligible, adverse impacts on surface water quality would occur from continued recreational uses, including potential leaks and spillage of boat fuels. No violations of water quality standards would be expected. No impairment of park resources would result from implementation of this alternative.

4.3 AIR QUALITY

4.3.1 Laws, Regulations and Policies

Air pollution sources within national parks must comply with all federal, state and local regulations. The Clean Air Act (CAA) established National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare from air pollution. The CAA also established the Prevention of Significant Deterioration (PSD) of Air Quality program to protect the air in relatively clean areas. One purpose of the PSD program is to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic or historic value. (42 U.S.C. 7401 et seq.). The PSD provisions also include a classification approach for controlling air pollution. Class I areas are afforded the greatest degree of air quality protection. Very little deterioration of air quality is allowed in these areas. Class I areas include international parks, national wilderness areas and national memorial parks in excess of 5,000 acres, and national parks in excess of 6,000 acres that were in existence as of August 7, 1977, when the CAA was amended. Currently, there are 48 Class I designated areas in the NPS system. Under the PSD program, the recreation area superintendent is given responsibility to protect visibility and all other Class I area air quality related values from the adverse effects of air pollution. Furthermore, the CAA established a national goal of preventing any future, and remedying any existing, human-made visibility impairment in Class I areas. National Park Service areas that are not designated Class I are

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Class II, and the CAA allows only moderate air quality deterioration in these areas. In no case, however, may pollution concentrations violate any of the NAAQS.

Glen Canyon NRA is designated as a Class II Air Quality area under the Clean Air Act. The main purpose of this act is to protect and enhance the nation's air quality to promote the public health and welfare. The act establishes specific programs to provide protection for air resources and values, including the program to prevent significant deterioration of air quality in clean air regions of the country. However, the NRA area does not possess sufficient autonomous authority to address issues of air quality improvements when air pollution originates outside the boundaries.

NPS Management Policies 2001 (section 4.7) directs parks and NRAs to seek to perpetuate the best possible air quality to preserve natural resources and systems, preserve cultural resources, sustain visitor enjoyment, human health and preserve scenic vistas. To accomplish these goals, the parks are directed to comply with all federal, state and local air quality regulations and permitting requirements. Additionally, *NPS Management Policies 2001* states that the NPS will assume an aggressive role in promoting and pursuing measures to protect air quality-related values from the adverse impacts of air pollution. Vegetation, visibility, water quality, wildlife, historic and pre-historic structures and objects, cultural landscapes, and most other elements of a park environment are sensitive to air pollution and are referred to as "air quality-related values." In cases of doubt as to the impacts of existing or potential air pollution on NRA resources, the NPS will err on the side of protecting air quality and related values for future generations.

The Organic Act and NPS Management Policies 2001 apply equally to all NPS managed areas, regardless of CAA designation. Therefore, the NPS will protect resources at both Class I and Class II designated units. Furthermore, the NPS Organic Act and NPS Management Policies 2001 provide additional protection from that afforded by the CAA's NAAQS alone because NPS has documented that specific park air quality related values can be adversely affected at levels below the NAAQS or by pollutants for which no NAAQS exist.

Conformity Requirements – National Park Service areas that do not meet the NAAQS or whose resources are already being adversely affected by current ambient levels require a greater degree of consideration and scrutiny by NPS managers. Areas that do not meet the NAAQS for any pollutant are designated as non-attainment areas. Section 176 of the CAA states that no department, agency, or instrumentality of the federal government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not conform to a state implementation plan. The assurance of conformity to such a plan shall be an affirmative responsibility of the head of such department, agency or instrumentality.

Essentially, federal agencies must ensure that any action taken does not interfere with a state's plan to attain and maintain the NAAQS in designated non-attainment areas. In making decisions regarding any major action within a designated non-attainment area, park managers should discuss their plans with the appropriate state air pollution control agency to determine the applicability of conformity requirements.

4.3.2 Impact Indicators, Criteria and Methodology

Local ambient air quality data from monitoring sites nearby the recreation area were reviewed. The occurrence of any exceedances (where applicable) and the level and frequency of pollutant concentrations were ascertained. Current conditions were assessed from regional data. The impact topic analyzed focused on the impacts to air quality related values and human health (e.g., visibility, smell) from airborne pollutants related to construction activities and operation of the proposed improvements. Impact thresholds may be qualitative (e.g., photos of degraded visibility) or quantitative (e.g., federal air quality standard based or emissions based), depending on what type of information is appropriate or available. There are five impact categories relevant to air quality issues: negligible, minor, moderate, major and impairment. Each category is discussed below relative to potential airborne pollution impacts from the alternatives on NRA resources and human health.

Negligible. There is no smell of exhaust and no visible smoke. Dust from construction activities can be controlled by mitigation. Ambient air quality concentrations would not be anticipated to exceed the allowable CAA Class II increment levels.

Minor. There is a slight smell of exhaust and smoke is visible during brief periods of time. Dust from use the dirt roads is visible during brief periods. Dust from construction activities is visible only during the work period and can be easily mitigated. Ambient air quality concentrations would not be anticipated to exceed the allowable CAA Class II increment levels.

Moderate. Gasoline fumes and exhaust are easily detectable in high-use areas. Smoke is visible during periods of high use. Dust from the use of dirt roads or from construction activities is visible over a large area and for extended periods of time. Mitigation is possible but is only partially effective. Ambient air quality concentrations would not be anticipated to exceed the allowable CAA Class II increment levels.

Major. Smoke and gasoline fumes are easily detectable for extended periods of time over large areas. Dust from the use of dirt roads and construction activities is visible for an extended amount of time and mitigation is unable to alleviate impacts. Ambient air quality concentrations equal or occasionally exceed allowable CAA Class II increment standards.

Impairment. Air emissions would exceed standards, and air quality in the NRA would be adversely affected to the point that the purpose of the recreation area could not be fulfilled, and NRA resources could not be experienced and enjoyed by future generations.

4.3.3 Alternative A (No-Action Alternative)

Impact Analysis – The no-action alternative would allow the continuation of current uses and implement actions under construction or contract award from the 1998 DCP. Elements of this alternative are depicted on figure 2.1 and are described in section 2.1.

Under the no-action alternative, existing housing and water facilities would remain unchanged, and only the previously planned modifications to land facilities would occur. Negligible construction related air impacts, such as generation of fugitive dust (i.e., particulate matter of different sizes [PM10 and PM2.5]) and gaseous air pollutants from the use of vehicles and other fuel-burning equipment, would occur under this alternative.

Additionally, continued use of the existing housing would continue to result in generation of air emissions from residential activities, such as space heating and consumer products. Continued visitor use of the area for camping and boating (motorized) would also result in periodic emissions of air contaminants from fires and internal combustion engines on cars, boats and other motor craft. These would represent negligible impacts on the local area that would continue on a long-term basis.

Cumulative Effects – The area of influence for assessment of cumulative effects on air quality was defined as the area within approximately 3 miles of the project site. Only the previously planned and analyzed development would occur at Wahweap Marina with implementation of the no-action alternative (alternative A). Cumulative effects would consist of those resulting from currently planned improvements and existing use of the area. These actions under alternative A would have a long-term, negligible, effect on air quality in the Wahweap specific area.

Conclusion – Alternative A would create long-term, negligible, impacts on air quality from current and previously proposed improvements as well as continued recreational uses, including emissions from cars, campers, and boats. No impairment of air quality would result from implementation of this alternative.

4.3.4 Alternative B

Impact Analysis – Short-term air quality impacts are anticipated to occur during the construction phase of alternative B. Under this alternative fugitive dust would be generated by ground-clearing operations, movement of vehicles and demolition of existing residential structures. Gaseous air pollutants would be generated from asphalt used for new parking areas, architectural coatings for proposed renovations as well as from the use of vehicles and other fuel-burning equipment.

Approximately 4 acres would be disturbed with the implementation of alternative B. Alternative B combines a number of compatible elements derived during project scoping. Proposed developments in this alternative include reducing and modifying concessioner housing, improving the layouts of the dry boat storage and construction areas and upgrading the Stateline parking area. Elements of this alternative are depicted on figure 2.2 and are described in section 2.2.

Through the implementation of mitigation measures, construction related emissions would be below incremental level limits set by the CCA for Class II areas. As a result, construction emissions related to alternative B would be considered temporary and minor to moderate impacts on air quality.

Under alternative B, little new construction would occur; most of the improvements to facilities would consist of renovations with only minor expansions of dock and staff facilities. The only new land use that would contribute to long-term air emissions would be the information/first contact booth to be placed at the South entrance. The air pollutant contributions from the booth would be minimal, as they would be primarily related to space heating and electrical consumption. Continued use of the area by visitors for camping and boating would result in periodic emissions of air contaminants from fires and internal combustion engines on cars, boats and other motor craft.

Under alternative B, there are also many potential pollution reduction actions. These actions include a reduction of long-term and seasonal housing within the NRA, removal of the Lake Powell Motel, implementation of a shuttle between the parking area and marina, and improvements to vehicular circulation. The reduction of housing in the Glen Canyon NRA would result in a decrease in air emissions within the NRA, primarily related to the use of natural gas and electrical consumption. The use of the shuttles and improved circulation would reduce vehicular traffic and congestion near the ramps, thus reducing the potential for buildup of carbon monoxide as well as reducing overall emissions from vehicle activity.

Finally, the Wahweap Development is not located in a designated non-attainment area. A review of available air quality data indicates that ambient air quality is well below the federal limits for each criterion pollutant monitored, and increases would likely be on the order of less than a ton a year. Therefore, impacts on air quality from the development and operation of alternative B would be negligible to minor, continuing over the long-term period of operation.

Cumulative Effects – Short-term cumulative impacts would result from the combination of emissions from the construction of the proposed improvements with other local construction emissions. No other projects have been identified within the project area. As a result, cumulative impacts on air quality from construction activities would remain short-term and negligible. Long-term adverse cumulative impacts would result from continued and increased use of the area by cars, boats and other motor craft and would be negligible to minor.

Conclusion – Alternative B would create both short- and long-term, negligible-to-moderate, adverse impacts on air quality, from construction dust and gaseous emissions, and increased recreational use of the area. No impairment of air quality would result from implementation of this alternative.

4.3.5 Alternative C (Preferred Alternative)

Impact Analysis – Alternative C combines compatible elements derived during the scoping process that accomplished the planning objectives described in chapter 1.0. Many elements of this alternative are the same as alternative B. The most notable changes include a different concessioner-housing program, relocating the dry boat storage area and providing additional food services. This alternative is also based on a concept of dispersing use to two key activity nodes; the Stateline and Wahweap launch ramps and the concentration of compatible land use activities at these nodes. Elements of this alternative are depicted on figure 2.3 and are described in section 2.3.

Impacts on air quality resulting from construction of alternative C would be similar to those described for alternative B; short term, minor to moderate, and potentially adverse. Construction activities would result in the disturbance of approximately 7 acres. Operational air pollutants resulting from alternative C would be slightly higher than that for alternative B due to the proposed additional food services at Stateline Launch Ramp, enlarged lodge facilities at the Wahweap Marina, and larger fee-gate facilities. Potentially adverse, long-term impacts under alternative C would be negligible to minor.

Cumulative Effects – Cumulative effects associated with alternative C would be similar as those described for alternative B. As previously indicated, short-term cumulative impacts would result from the combination of emissions from the construction of the proposed improvements with other local construction emissions. No other projects have been identified within the project area. As a result, cumulative impacts on air quality from construction activities would remain short-term and negligible. Long-term adverse cumulative impacts would result from continued and increased use of the area by cars, boats and other motor craft and would be negligible to minor.

Conclusion. Alternative C would create both short- and long-term, negligible-to-moderate, adverse impacts on air quality, similar to alternative B, but with more effects from new food services and expanded marina facilities. No impairment of air quality would result from implementation of this alternative.

4.4 SOUNDSCAPES

4.4.1 Laws, Regulations, and Policies

The *NPS Management Policies 2001* (section 4.9) requires the agency to preserve, to the greatest extent possible, the natural soundscapes of parks. Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds. *NPS Management Policies 2001* directs superintendents to identify what levels of human-caused sound can be accepted within the management purposes of the parks.

Directors Order #47: Soundscape Preservation and Noise Management (DO-47), defines appropriate and inappropriate noise. The overall goal of NPS units, as defined in DO-47, is the protection, maintenance, or restoration of the natural soundscape resource.

However, it does state that some sound producing activities, including recreational activities, may be appropriate if they are included in the park's purpose as defined by its enabling legislation. The enabling legislation for Glen Canyon NRA states that the purpose of the recreation area is "to provide for public outdoor recreation use and enjoyment... and to preserve scenic, scientific, and historic features contributing to public enjoyment of the area." The establishing legislation for Glen Canyon National Recreation Area (86 Stat 1311) states that the recreation area was established "to provide for public outdoor recreation use and enjoyment of Lake Powell and the lands adjacent thereto." Based on this statement, some sound-producing recreational activities are expected in Glen Canyon NRA.

Laws for noise abatement of motorized vessels are regulated by the NPS within Glen Canyon NRA and other units of the National Park System (36 CFR, Part 3.7). "Operating a vessel in or upon inland waters so as to exceed a noise level of 82 decibels measured at a distance of 82 feet (25 meters) from the vessel is prohibited." These standards are difficult to enforce, as they require estimation of distances in addition to monitoring sound.

4.4.2 Impact Indicators, Criteria and Methodology

Noise is generally defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance and, in the extreme, hearing impairment. The unit of measurement used to describe a noise level is the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease. The human ear is not equally sensitive to all frequencies within the sound spectrum. A method called AA-weighting@ is used to filter noise frequencies that are not audible to the human ear. The A-scale approximates the frequency response of the average young ear when listening to most ordinary everyday sounds. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Therefore, the "A-weighted" noise scale is used for measurements and standards involving the human perception of noise. In this report, all noise levels are A-weighted and dBA is understood to identify the A-weighted decibel.

Human perception of noise has no simple correlation with acoustical energy. The perception of noise is not linear in terms of dBA or in terms of acoustical energy. Two noise sources do not sound twice as loud as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud.

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The L_{90} is the sound level descriptor specified in *Director's Order 47* to use in estimating the natural ambient sound level when only a single descriptor is used. It represents the sound level exceeded 90% of the measuring time. While specific background noise studies are not available for the Glen Canyon NRA, background noise levels were recorded and presented in the Harris Miller Miller & Hanson, Inc. study (2002) at the low-use Last Chance Canyon site, which identified the L_{90} as 13.4 dB. This noise level would be used to assess impacts in areas where the natural soundscape is currently unimpaired. Given the Wahweap Marina's setting and permanent habitation by humans, it is assumed that the quality of the soundscape within the marina would be considered diminished when compared to the natural soundscape. It is assumed that ambient noise level at the Wahweap Marina area ranges from active urban in the developed areas and high use zones to quiet rural in the outlying areas where use levels are considerably lower. These noise levels would be considered acceptable under the management policies as it is consistent with the purpose of the NRA.

The following criteria were used to define specifically the impacts within 1 mile from noise due to construction and improvements resulting from the proposed alternatives:

Negligible. In the Recreation and Resource Utilization (RRU) zone and Development zone (designated in the Glen Canyon NRA GMP), sound levels rarely exceed levels specified in 36 CFR 3.7. Within the RRU and Development Zones, low-level human-caused sound would occur 50 percent or less of the time during daylight hours. Human-caused noise is rare between the hours of 10:00 PM and 6:00 AM.

Minor. In the RRU and Development zones, sound levels occasionally exceed levels specified in 36 CFR 3.7. During the busiest days, the RRU and Development Zones may experience human-caused noise at moderate levels for a substantial portion of each hour during daylight hours. Human-caused noise is infrequently noticeable between the hours of 10:00 PM and 6:00 AM.

Moderate. In the RRU and Development zones, human-caused sound is present in a majority of the area during most of the daylight hours. When present, noise levels can be high compared to the natural soundscape much of the time. Sound levels occasionally exceed 36 CFR 3.7 levels. During the busiest days, a majority of the RRU and Development Zones may experience human-caused noise at moderate to high levels compared to the natural soundscape for a majority of daylight hours. Human-caused noise is occasionally noticeable between the hours of 10:00 PM and 6:00 AM.

Major. In the RRU and Development zones, human-caused sound is present in most of the area during most of the time during daylight hours. When present, noise levels can be high compared to the natural soundscape most of the time. Sound levels exceed 36 CFR 3.7 levels more than rarely. During the busiest days, most of the RRU and Development Zones may experience human-caused noise at moderate-to-high levels compared to the natural soundscape for most of each hour during daylight hours. Human-caused noise is often noticeable between the hours of 10:00 PM and 6:00 AM.

Impairment. Noise levels change substantially and conflict with the intended use of that area, thereby precluding the enjoyment of NRA resources by most park visitors.

As quantitative data were not available, the impacts to the soundscapes were assessed through the identification and description of the types of activities that could adversely impact the ambient noise environment, corresponding noise sources, relative noise levels, and other characteristics.

Based on the relative noise levels, a qualitative assessment was performed to evaluate the potential for a substantial increase in ambient noise levels that would be disruptive to visitor use of the area. Assessments also were performed where noise-sensitive uses are located or would expose persons to excessive noise levels, taking into account the frequency, magnitude, duration, location, and reversibility of the potential impact.

4.4.3 Alternative A (No-Action Alternative)

Impact Analysis – Under the no-action alternative, the previously planned and partially constructed improvements would be completed. Current human-generated sounds in the area include construction activity, automobile traffic, watercraft, visitors and campers. No additional human-caused sound would be generated. Therefore, impacts would remain localized, and minor to moderate.

Cumulative Effects – The area of influence for the assessment of impacts on the natural soundscape was defined as the area within 1 mile of the Wahweap Marina. The non-natural noise associated with the future demand for services and facilities at Wahweap Marina, added to the noise associated with the construction of the previously planned projects, would result in minor to moderate impacts on the natural soundscape.

Conclusion – Alternative A would result in short- and long-term, minor-to-moderate, adverse impacts on the natural soundscape. Short-term disturbance is due to construction of previously evaluated and approved projects, such as the renovations to the Wahweap campground. Long-term disturbance to the area is due to existing use of the NRA by visitors and vehicles. No impairment of the natural soundscape would result from implementation of this alternative.

4.4.4 Alternative B

Impact Analysis – Under alternative B, noise would be generated during both construction and continued operation of the proposed facilities. Construction-generated sound would include construction equipment, vehicles and building activities, which would occur intermittently during the four to six years of development. Noise levels from typical construction efforts may reach as high as 89 dBA 50 feet from the source, which would drop off 6 dBA per doubling of distance. So at 100 feet from the sound source the noise level would be 83 dBA and at 200 feet it would be 77 dBA; this would continue until the sound became indistinguishable from the natural, or ambient noise, whichever is greater. The temporary duration and intermittent nature of the construction-generated sound would result in adverse localized, short-term, moderate impacts on park soundscapes.

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To reduce potential impacts on soundscapes, all construction vehicles and equipment would be equipped with properly operating and maintained mufflers. In addition, noise-generating construction activities would be limited to daylight hours to minimize the potential impacts on overnight visitors of the Wahweap Marina area. Implementation of these measures would reduce potential soundscape construction impacts from moderate to minor in many cases.

Wahweap Marina is designated as a development area in the Glen Canyon NRA GMP (NPS 1979). This designation, together with *NPS Management Policies 2001*, would allow for moderate to major noise level impacts at Wahweap Marina. Existing noise sources at Wahweap Marina include vehicle traffic, watercraft, aircraft and area visitors utilizing the Wahweap Marina facilities. The proposed improvements to the Stateline launch ramp area are intended to distribute marina users, which would result in a slight decrease in noise levels at the Wahweap Marina and an increase in noise levels at the Stateline launch ramp. Additionally, implementation of the shuttle service from the parking area to the marina would reduce vehicular traffic near the marina, which would also slightly reduce noise levels generated by guest activities.

Although no specific noise measurements have been conducted and specific noise level limits have not been set for the area, other than for watercraft, it is not anticipated that future marina operations or proposed improvements would cause disruption of visitor uses. Therefore, long-term adverse impacts on soundscapes from alternative B would be considered moderate.



Cumulative Effects – Impacts from the construction and continued operation of Wahweap Marina would be the dominant aspect of cumulative impacts on the natural soundscape. No other projects have been identified within the impact boundary. Together, these actions would result in long-term, minor-to-moderate impacts on the natural soundscape in the area.

Conclusion – Alternative B would not significantly alter the types or numbers of non-natural sources of noise in the area. Additionally, a slight increase (3 dBA) in the existing noise levels would not be expected to disrupt most visitor activities. The actions taken during construction and operation of the facilities would result in short-term adverse impacts on the natural soundscape, however, with the implementation of identified mitigation measures noise levels from construction would only result in moderate impacts. No impairment of the natural soundscape would result from implementation of this alternative.

4.4.5 Alternative C (Preferred Alternative)

Impact Analysis – Impacts on soundscapes resulting from construction and operation of alternative C would be similar to those described for alternative B, with a slight increase in human-generated sound associated with boating activity, since the facility would support additional boat slips. Additionally, noise levels at the Stateline launch ramp would likely increase to moderate levels as the visitors were disbursed more evenly between the two launch facilities. Changes to the natural soundscape would include localized adverse short- and long-term, minor-to-moderate impacts.

Cumulative Effects – Cumulative impacts on the natural soundscape would be essentially the same as described for alternative B (i.e., long term, adverse, and minor to moderate).

Conclusion – Alternative C would result in additional non-natural sources of noise in the area that would exceed ambient levels, but these would not be expected to disrupt most visitor activities (similar to alternative B). The actions taken during construction and operation of the facilities would result in short- and long-term, moderate-to-minor, adverse impacts on the natural soundscape. No impairment of the natural soundscape would result from implementation of this alternative.

4.5 WILDLIFE AND WILDLIFE HABITAT

4.5.1 Regulation and Policy

Current laws and policies require that the following conditions be achieved in Glen Canyon NRA for wildlife and habitats.

Desired Conditions	Sources
Populations of native animal species function in as natural a condition as possible, except where special management considerations are warranted.	<i>NPS Management Policies.</i>
Native species populations that have been severely reduced in or extirpated from Glen Canyon NRA are restored where feasible and sustainable.	<i>NPS Management Policies.</i>
Invasive species are reduced in numbers and area, or are eliminated from the natural areas of Glen Canyon NRA. Such action is undertaken wherever such species threaten the native wildlife resource or public health, or when control is prudent and feasible.	<i>NPS Management Policies.</i>
Federal and state-listed threatened or endangered species and their habitats are protected and sustained.	Endangered Species Act and equivalent state protective legislation. National Environmental Policy Act. <i>NPS Management Policies.</i>

Other Regulations – The National Park Service Organic Act, which directs national parks (including Glen Canyon NRA) to conserve wildlife unimpaired for future generations, is interpreted by the NPS to mean native animal life should be protected and perpetuated as part of the recreation area's natural ecosystem. The Redwoods Act of 1978 reaffirms protection provided under the Organic acts and the Migratory Bird Treaty and Bald Eagle Act help to protect bird species.

The recreation area also manages and monitors wildlife cooperatively with the Arizona Game and Fish Department and the Utah Division of Wildlife.

4.5.2 Methodology

Information was gathered from literature and from recreation area, state, and federal wildlife specialists to determine whether any of the alternatives could potentially disrupt the natural behaviors of wildlife species in the Wahweap area. The following criteria were used in interpreting the level of impact on wildlife:

Negligible. Wildlife and habitats would not be affected or the effects would be at or below the level of detection, would be short term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species population.

Minor. Effects on wildlife and habitats would be detectable, although the effects would likely be short term, localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate. Effects on wildlife and habitats would be readily detectable, long term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

Major. Effects on wildlife and habitats would be obvious, long term, and would have substantial consequences to wildlife populations, in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Impairment. The impact would contribute substantially to the deterioration of natural resources to the extent that the NRA's wildlife and habitat would no longer function as a natural system. Wildlife and its habitat would be affected over the long term to the point that the NRA's purpose (enabling legislation, *General Management Plan*, *Strategic Plan*) could not be fulfilled and the resource could not be experienced and enjoyed by future generations.

When these criteria were not applicable, standard definitions for degree of change related to existing conditions were used. In the absence of quantitative data, best professional judgment prevailed.

4.5.3 Alternative A (No-Action Alternative)

Impact Analysis – Under alternative A, wildlife in the Wahweap area would continue to encounter impacts associated with the presence of visitors and vehicles. Moving the RV park to the campground area and having the area restored to native habitat would create additional wildlife habitat in the area.

Cumulative Impacts – The area of analysis is the immediate area of the Wahweap Marina. Cumulative impacts to wildlife would be from impacts described above.

Conclusion. Impacts resulting from implementation of alternative A would be long term, minor, and adverse due to disturbance from visitors and residents and by the presence of facilities in the area. Long-term, minor, beneficial impacts to wildlife would result from moving the recreational vehicle park to the campground area. No impairment of park resources would result from implementation of this alternative.

4.5.4 Alternative B

Impact Analysis – Under this alternative, approximately 26 acres of habitat would be restored due to moving and removal of structures in the area. (See appendix F for an itemization of the acreage of disturbance and restoration associated with each alternative.) Construction activities may temporarily disturb some wildlife in these restored areas. Construction of new and expanded facilities would result in the disturbance of approximately 4 acres, most of which is associated with construction of a new visitor contact station. None of the new construction would occur within sensitive or high value habitat.

Cumulative Impacts – Cumulative impacts to wildlife would result from actions included in the prior DCP as well as other approved actions, such as the wastewater treatment system. Other cumulative impacts could result from the Antelope Point improvement project. Impacts to wildlife from the Antelope Point improvements would only affect wildlife species that are more mobile and have greater ranges, such as bird species.

Conclusion – Impacts resulting from implementation of alternative B would be long term, minor, and adverse from increased disturbance, presence and development of facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the area to natural conditions. No impairment of wildlife habitats would result from implementation of this alternative.

4.5.6 Alternative C (Preferred Alternative)

Impact Analysis – Under this alternative, approximately 18 acres of habitat would be restored due to moving and removal of structures in the area. Construction activities may temporarily disturb some wildlife in these restored areas. Construction of new and expanded facilities would result in the disturbance of approximately 7 acres, none of which would be considered sensitive.

Cumulative Impacts – Cumulative impacts resulting from alternative C would be similar to those described in alternative B.

Conclusion. Impacts resulting from implementation of alternative C would be long term, minor, and adverse from construction of additional facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the areas to natural conditions. No impairment of wildlife habitats would result from implementation of this alternative.

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4.6 SOILS AND GEOLOGY

4.6.1 Regulation and Policy

Current laws and policies require that the following conditions be achieved in Glen Canyon NRA for soils and geology.

Desired Conditions	Sources
Soil resources and processes function in as natural a condition as possible, except where special management considerations are allowable under policy.	<i>NPS Management Policies.</i>
Soils classified by the U.S. Department of Agriculture, Natural Resources Conservation Service as prime or unique farmland soils are retained.	Council on Environmental Quality (1980) memorandum on prime and unique farmlands.
Natural geologic resources and processes function in as natural a condition as possible, except where special management considerations are allowable under policy.	<i>NPS Management Policies.</i>
Geologically hazardous areas will be avoided in the placement of new facilities.	<i>NPS Management Policies.</i>

Other Regulations – None.

4.6.2 Methodology

The impact assessment for geology and soils focused on effects the alternatives would have on geologic processes, including the formation and conservation of soil resources in the Wahweap area. Actions prescribed could affect soil resources through accelerated erosion, soil loss or soil removal. The analysis was conducted by examining the types of soils and amount of area that would be disturbed or paved, and applying knowledge of expected effects under each alternative based on professional judgment. The following definitions were used to assess the intensity of impact:

Negligible. Soils or geologic features would not be affected or if affected would not be measurable. Any effects on soil productivity or fertility would be slight, short-term, and would occur in a relatively small area.

Minor. The effects on soils or geologic features would be detectable, but likely short-term. Effects on soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

Moderate. The effects on soil or geologic features would be readily apparent, long term, and would slightly change the soil or geologic characteristics over a relatively large area. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.

Major. The effect on soil or geologic features would be readily apparent, long term, and would substantially change the soil or geologic characteristics over a large area in and out of the NRA. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Impairment. The effects would cause a permanent change in a large portion of the overall acreage of the NRA, affecting the resource to the point that the NRA's purpose could not be fulfilled and the resource would be degraded precluding the enjoyment of future generations.

4.6.3 Alternative A (No-Action Alternative)

Impact Analysis – Impacts resulting from implementation of alternative A would be long term, minor, and adverse caused from disturbance by visitors and residents and by the presence of facilities in the area. Long-term, minor, beneficial impacts to soil would result from moving the RV park. The area where the RV park existed would be reclaimed to native vegetation.

Cumulative Impacts – Cumulative effects in this area under alternative A would consist of the loss of soil from erosion due to the continued use of the area by vehicles and campers. Because relatively few acres have been paved, and the areas that were paved or disturbed were mainly rocky sites with poor soils, the cumulative impact on geologic processes and soil resources would be long term, adverse and minor.

Conclusion – Impacts resulting from implementation of alternative A would be long term, minor, and adverse caused by disturbance from visitors and residents and by the presence of facilities in the area. Long-term, minor, beneficial impacts to wildlife would result from moving the RV park. No impairment of park resources would result from implementation of this alternative.

4.6.4 Alternative B

Impact Analysis – This alternative would restore approximately 26 acres to native vegetation communities and enhance soils in the area as a result. New disturbance would occur on approximately 4 acres; soils in these areas would be disturbed by paving and facility development.

Cumulative Impacts – Cumulative impacts of alternative B would be similar to those of alternative A.

Conclusion – Impacts resulting from implementation of alternative B would be long term, minor, and adverse from increased disturbance, the presence and development of facilities

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and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the area to natural conditions. No impairment of park resources would result from implementation of this alternative.

4.6.5 Alternative C (Preferred Alternative)

Impact Analysis – This alternative would restore approximately 18 acres to native habitat and enhance soils in the area as a result. New construction and facility development would disturb soils on approximately 7 acres.

Cumulative Impacts – Cumulative impacts of alternative C would be similar to those of alternative B.

Conclusion – Impacts resulting from implementation of alternative C would be long term, minor, and adverse from construction of additional facilities and additional visitors at Wahweap. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel, and the restoration of the areas to natural conditions. No impairment of park resources would result from implementation of this alternative.

4.7 THREATENED, ENDANGERED, OR SPECIAL CONCERN SPECIES

4.7.1 Regulation and Policy

Desired Conditions	Sources
Federally listed and state-listed threatened and endangered species and their habitats will be sustained	Endangered Species Act <i>NPS Management Policies</i> EO 13112, “Invasive Species”
Native species populations that have been severely reduced or extirpated from the monument will be restored where feasible and sustainable.	Endangered Species Act <i>NPS Management Policies</i> EO 13112, “Invasive Species”
The management of populations of exotic plant and animal species, up to and including eradication, will be undertaken wherever such species threaten monument resources or public health and when control is prudent and feasible.	Endangered Species Act <i>NPS Management Policies</i> EO 13112, “Invasive Species”

4.7.2 Methodology

The Endangered Species Act defines the terminology used to assess impacts to listed species as follows:

No Effect. Impacts would not affect a listed species or designated habitat. (*Negligible*)

May Effect/Is not likely to adversely affect. Effects on special status species would be discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or completely beneficial. (*Minor*)

May affect/likely to adversely affect. Effect on a listed species might occur as a direct or indirect result of the proposed action, and the effect would either not be discountable or completely beneficial. (*Moderate to Major*) Moderate impacts on species would result in a local population decline due to reduced survivorship, declines in population and/or a shift in the distribution; no direct casualty or mortality would occur. Major impacts would involve a disruption of habitat, nests and breeding grounds of a protected species such that direct casualty or mortality would result in removal of individuals of a protected species from the population.

Likely to jeopardize proposed species/adversely modify proposed critical habitat. Effects could jeopardize the continued existence of a proposed species or adversely modify critical habitat to a species within and/or outside the park boundaries. (*Impairment*)

4.7.3 Alternative A (No-Action Alternative)

Impact Analysis – Under alternative A, uses to the area would continue as they have in the past. Impacts to threatened, endangered, or special concern species would be short term and minor (may effect).

Cumulative Impacts – The area of influence for the analysis of cumulative effects is defined as the immediate Wahweap Marina area. Past activities in the area that could have an effect on threatened, endangered, or special concern species would include improvements to the Wahweap wastewater treatment system and development of the Antelope Point area. These actions and other ongoing activities at Wahweap could have short term minor effects on threatened, endangered or special concern species.

Conclusion – Impacts on special status species would be long term, negligible, and potentially adverse because of continued disturbance and degradation of habitat at Wahweap from the presence of facilities and visitors. These negligible impacts would likely not adversely affect listed species as none are known to occur in the area. No impairment of park resources would result from implementation of this alternative.

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4.7.4 Alternative B

Impact Analysis – Under alternative B, uses of the area would continue as they have in the past. Impacts to threatened, endangered, or special concern species would be long term and negligible (no effect).

Cumulative Impacts – Cumulative impacts to the area under alternative B would be the same as alternative A.

Conclusion – Impacts on special status species would be long term, negligible and adverse because of continued disturbance and degradation of habitat at Wahweap from the presence of facilities and visitors. These negligible impacts would likely not adversely affect listed species as none are known to occur in the area. No impairment of park resources would result from implementation of this alternative.

4.7.5 Alternative C (Preferred Alternative)

Impact Analysis – Under alternative C, uses to the area would continue as they have in the past. Impacts to threatened, endangered, or special concern species would be short term and negligible (no effect).

Cumulative Impacts – Cumulative impacts to the area under alternative C would be the same as alternative A.

Conclusion – Impacts on special status species would be long term, negligible, and adverse because of continued disturbance and degradation of habitat at Wahweap from the presence of facilities and visitors. These negligible impacts would likely not adversely affect listed species as none are known to occur in the area. No impairment of park resources would result from implementation of this alternative.

4.8 VEGETATION

4.8.1 Regulation and Policy

Current laws and policies require that the following conditions be achieved in Glen Canyon NRA for vegetation.

Desired Conditions	Sources
Populations of native plant species function in as natural a condition as possible, except where special management considerations are warranted.	<i>NPS Management Policies.</i>
Native species populations that have been severely reduced in or extirpated from Glen Canyon NRA are restored where feasible and sustainable.	<i>NPS Management Policies.</i>
Invasive species are reduced in numbers and area, or are eradicated from natural areas of Glen Canyon NRA. Such action is undertaken wherever such species threaten the native vegetation resource or public health, or when control is prudent and feasible.	<i>NPS Management Policies.</i>
Federal and state-listed endangered or threatened species and their habitats are protected and sustained.	Endangered Species Act and equivalent state protective legislation. National Environmental Policy Act. <i>NPS Management Policies.</i>

Other Regulations – The National Park Service Organic Act directs the recreation area to conserve the scenery and the natural objects unimpaired for future generations.

Methodology

The impacts of vegetation were evaluated in terms of impacts on native vegetation and nonnative vegetation. The following were used in interpreting the level of impact on vegetation in the Wahweap area:

Negligible. Individual native plants occasionally may be affected, but measurable or perceptible changes in plant community size, integrity, or continuity would not occur.

Minor. Impacts on native plants are measurable or perceptible and localized within a relatively small area. The overall viability of the plant community would not be affected and, if left alone, would recover.

Moderate. Impacts on native plants would cause a change in the plant community (e.g., abundance, distribution, quantity, or quality); however, the impact would remain localized.

Major. Impacts on native plant communities would be substantial, highly noticeable, and long term, and affect a sizable portion of the affected community type in and out of the NRA. Mitigation measures required to offset the adverse effects would be extensive and their success would not be guaranteed.

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Impairment. Impacts on native plant communities would be substantial, highly noticeable, permanent, cannot be mitigated, and would affect a relatively large area in and out of the NRA.

4.8.2 Alternative A (No-Action Alternative)

Impact Analysis – Impacts resulting from implementation of alternative A would be long term, minor, and adverse caused from disturbance by visitors and residents and by the presence of facilities in the area, which would promote the invasion of exotic vegetation. Long-term, minor, beneficial impacts to vegetation would result from moving the RV park. The area where the RV park existed would be reclaimed to native species.

Cumulative Impacts – The area of influence for the analysis of cumulative effects is defined as the immediate Wahweap Marina area. Cumulative impacts to vegetation in the area would be from improvements to vegetation from the restoration of the sewage lagoons and invasion of plant communities by exotic vegetation.

Conclusion – Impacts resulting from implementation of alternative A would be long term, minor, and adverse caused from disturbance by visitors and residents and by the presence of facilities in the area, which would promote the invasion of exotic vegetation. Long-term, minor, beneficial impacts to vegetation would result from moving the recreational vehicle park. No impairment of vegetation would result from implementation of this alternative.

4.8.3 Alternative B

Impact Analysis – As with alternative A, impacts would result from ongoing disturbance associated with visitor activities and the presence of existing facilities. This alternative would restore approximately 26 acres to native habitat and enhance vegetation in the area as a result. Construction of new and enhanced facilities would disturb approximately 4 acres. Invasion of exotic vegetation could occur.

Cumulative Impacts – Cumulative impacts of alternative B would be similar to those of alternative A.

Conclusion – Impacts resulting from implementation of alternative B would be long term, minor, and adverse from increased disturbance and development of facilities, additional visitors at Wahweap, and potential for invasion of exotic weeds. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel and the restoration of the area to natural conditions. No impairment of vegetation would result from implementation of this alternative.

4.8.4 Alternative C (Preferred Alternative)

Impact Analysis – As with the other alternatives, impacts would result from ongoing disturbance associated with visitor activities. This alternative would restore approximately 18 acres to native vegetation. Construction of new and enhanced facilities would disturb approximately 7 acres. Invasion of exotic vegetation could occur.

Cumulative Impacts – Cumulative impacts of alternative C would be similar to those of alternative B.

Conclusion – Impacts resulting from implementation of alternative C would be long term, minor, and adverse from construction of additional facilities, additional visitors at Wahweap, and potential for invasion of exotic weeds. Long-term, minor, beneficial impacts would result from the removal of housing and the Lake Powell Motel, and the restoration of the areas to natural conditions. No impairment of vegetation would result from implementation of this alternative.

4.9 VISITOR USE AND EXPERIENCE

4.9.1 Regulation and Policy

It is the management policy of the NPS to preserve and protect scenic vistas and to ensure the quality of the visitor experience. Current laws and policies require that the following conditions be achieved in Glen Canyon NRA for visitor use and experience.

Desired Conditions	Sources
Visitors have opportunities to enjoy the recreation area in ways that leave resources unimpaired for future generations.	NPS Organic Act. <i>NPS Management Policies.</i>
Visitors understand and appreciate Glen Canyon NRA values and resources and have the information necessary to adapt to the area's environment.	<i>NPS Management Policies.</i>
Recreational uses are promoted and regulated. Basic visitor needs are met in keeping with the national recreation area purposes.	NPS Organic Act. Title 36 of the Code of Federal Regulations. <i>NPS Management Policies.</i>
To the extent feasible, facilities, programs and services in the national recreation area are accessible to and usable by all people, including those with disabilities.	Americans with Disabilities Act. Architectural Barriers Act. Rehabilitation Act. <i>NPS Management Policies.</i>
Visitors who use federal facilities and services for outdoor recreation may pay a greater share of the cost of providing those opportunities than the population as a whole.	<i>NPS Management Policies.</i> Recreational Fee Demonstration Program (U.S. Department of the Interior et al. 1998).

Desired Conditions	Sources
Glen Canyon NRA has identified implementation commitments for visitor carrying capacities for all areas of the unit.	1978 National Parks and Recreation Act (Public Law 95-625). <i>NPS Management Policies.</i>

4.9.2 Methodology

Impact thresholds are listed below.

Negligible. Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short term. The visitor would not likely be aware of the effects associated with the alternative.

Minor. Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.

Moderate. Changes in visitor use and/or experience would be readily apparent and likely long term. The visitor would be aware of the effects associated with the alternative and likely would be able to express an opinion about the changes.

Major. Changes in visitor use and/or experience would be readily apparent and have important long-term consequences. The visitor would be aware of the effects associated with the alternative and likely would express a strong opinion about the changes.

4.9.3 Alternative A (No-Action Alternative)

Impact Analysis – No changes to existing facilities or services are proposed under alternative A. Minor beneficial impacts to visitor conditions under alternative A would result from maintaining current facilities and services and implementing pre-approved construction projects, such as the new campground.

Cumulative Impacts – The area of influence for the analysis of cumulative effects is defined as the immediate Wahweap Marina area. Improvements to Wahweap are generally designed with the user and visitor in mind. Cumulative beneficial effects to the visitor experience from the improvements to other marinas, such as Antelope Point and Hite, could result from dispersing people to other areas.

Conclusion. Long-term, minor, beneficial impacts to the visitor experience would result from implementing projects already approved or under construction, such as the relocation of the RV park to the campground area.

4.9.4 Alternative B

Impact Analysis – Under this alternative, numerous facilities and infrastructure would be improved at Wahweap. Impacts to the visitor experience under this alternative would result from these improvements, including moving the existing RV park to the campground area. People camping with RVs would be closer to other amenities provided at the marina and would be within walking distance to most facilities. RV visitors would also be removed from the housing area, separating employees and visitors.

Impacts to the visitor experience under this alternative would also result from enhanced aesthetics associated with the reduction of employee housing on the ridgeline, reconfiguration of the dry boat and construction areas, and the removal of the Lake Powell Motel.

New facilities would also improve the visitor experience. These improvements would include:

- A new contact station would help orient visitors.
- Parking at Stateline Launch Ramp would provide an alternative to Wahweap Launch Ramp.
- A new bike trail would connect Wahweap to the Page Rim Trail.
- Remodel of the lodge conference room facilities and drop-off.
- Boat ramp extensions for low-water conditions.
- Improvement of fuel docks.

Cumulative Impacts – Cumulative effects of this alternative would be similar to those described in alternative A.

Conclusion – Long-term, minor-to-moderate beneficial impacts to the visitor experience would result from the overall improvement of facilities available to the public, such as the visitor contact station.

4.9.5 Alternative C (Preferred Alternative)

Impact Analysis – Under this alternative, numerous facilities and infrastructure would be improved at Wahweap. These improvements would make launching and retrieving of boats more efficient, and would provide enhancement of both inland and water-based services.

Impacts to the visitor experience under this alternative would be from moving the existing RV park to the campground area. People camping with RVs would be closer to other amenities provided at the marina and would be within walking distance to most facilities. RV visitors would also be removed from the housing area, separating employees and visitors. The relocation of the dry boat storage area would further remove visitors from the employee housing area. The new location of the dry boat storage area, adjacent to the boat rental area and the Lake, would improve the visitor experience.

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Impacts to the visitor experience under this alternative would be enhanced by improved aesthetics resulting from the reduction of employee housing on the ridgeline, reconfiguration of the construction areas, relocation of the dry boat storage area, and the removal of the Lake Powell Motel.

New facilities would also improve the visitor experience. Many of these new facilities would disperse visitors between Stateline and Wahweap launch ramps, reducing congestion and improving visitor experience. Improvements would include:

- A new contact station would help orient visitors
- Parking at Stateline Launch Ramp would provide an alternative to Wahweap Launch Ramp
- A new bike trail would connect Wahweap to the Page Rim Trail
- The expansion of the lodge conference facilities and rooms
- Boat ramp extensions for low-water conditions
- Improvement of fuel docks
- Additional food service facilities
- New shuttle between launch ramps

Cumulative Impacts – Cumulative effects of this alternative are similar to those described in alternative A.

Conclusion – Long-term, moderate, beneficial impacts to the visitor experience would result from the overall improvement of facilities available to the public, such as the visitor contact station and the relocation of the dry boat storage area closer to the launch ramp.

4.10 VISUAL RESOURCES

4.10.1 Regulation and Policy

Desired Conditions	Sources
Protect the landscape character and quality according to the guidelines of the existing visual management Class III designation.	Glen Canyon National Recreation Area Master Plan, 1979

Other Regulations – None.

4.10.2 Methodology

It is within the context of the existing visual management Class III designation, that the following definitions apply. For further explanation see the discussion of visual contrast and the accompanying matrix indicating compatibility with the various visual management designations.

Negligible. Changes to visual quality, while visible, are not at a level that would be readily evident to the casual viewer.

Minor. Changes to visual quality, would be perceived as adverse and readily evident to the casual viewer.

Moderate. Changes to visual quality would be highly negative and compete for dominance with the natural features present.

Major. Changes to visual quality would be seen as dominating, adverse elements in the landscape.

Impairment. Changes to visual quality would contribute to a permanent change to the character of the landscape, such that use and levels of visitor satisfaction identified as part of Glen Canyon NRA'S purpose could no longer be provided over the long term for future generations. Mitigation measures would not reduce impacts.

Impacts to visual resources were assessed by first comparing the nature and degree of change (level of contrast) between the existing visual character of the project area and that following implementation of an alternative. The type and degree of change predicted for each alternative was then compared to the visual management objectives of the area to determine it's compatibility with these objectives and hence, the level of impact.

As noted in the description of existing conditions, the Wahweap Marina contains a mix of strong natural/natural appearing landscape elements along with man-made developments associated with the marina, its operations and support facilities. Such a mix of elements would be the expected image in this case. The assessment of visual impacts therefore differs from the more typical situation where the degree of change (contrast) is evaluated between an existing natural or natural dominated landscape and some level of added modification. In this case, the change between the existing and future conditions involves distinctions that can best be assessed based on the following types of considerations:

- character of existing and future development
- scale/extent of existing and future development
- placement/prominence of existing and future development
- condition of existing and future development
- maintenance/order of existing and future development
- disturbance as a result of existing and future use and development

This assessment results in one of the following designations:

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Beneficial. The action results in a noticeable reduction or improvement of man-made modifications.

Not Visible. The changes or modifications are not visible or visually distinct from the existing condition.

Visible. The change would be adverse, and while visible, would not be readily evident to the casual viewer.

Evident. The proposed modifications would be seen as negative and readily evident to the casual viewer.

Competes for Dominance. The changes or modifications would be highly negative and compete for dominance with the natural features present.

Dominant. The modifications proposed would become dominating, adverse elements in the landscape.

Permanent Change. The modifications are of such an extent and degree that it would lead to a permanent change in the character of the landscape, compromising the ability of NPS to satisfactorily serve the public.

The final step in the assessment of impacts was to compare the levels of contrast or change with the visual management designation. This was done according to the following matrix.

		Visual Management Designation			
		I	II	III	IV
Nature/ Degree of Contrast	Character Change	Impairment	Impairment	Impairment	Impairment
	Dominates	Impairment	Impairment	Major	Moderate
	Competes	Impairment	Major	Moderate	Minor
	Evident	Major	Moderate	Minor	Negligible
	Visible	Moderate	Minor	Negligible	Negligible
	Not Visible	Minor	Negligible	Negligible	Negligible
	Improvement	Beneficial	Beneficial	Beneficial	Beneficial

The lands in the vicinity of the marina have been designated as Class III, which is defined as, “interesting but less unique or prominent than Class I or II areas. Nevertheless, they contribute to the interest of the overall scenery.”

4.10.3 Alternative A (No-Action Alternative)

Impact Analysis – Under the no-action alternative, no modifications to the marina and related facilities are proposed beyond those actions previously planned or approved in the 1998 DCP. These actions are not considered part of this action. Therefore, no direct visual change would result. Current conditions and practices would continue. Impacts would be negligible, but the adverse visual conditions that currently surround the dry boat storage, the employee housing, and construction area in particular would remain.

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Cumulative Effects – The area of analysis for cumulative impacts was defined to include the marina and visible areas within approximately 5 miles of the marina. The Navajo Generating Station is visible from the marina and surrounding areas on the lake. No other reasonably foreseeable modifications are proposed within this viewshed. Impacts on visual resources would therefore also be negligible.

Conclusion – No impairment of visual resources would result from implementation of this alternative.

4.10.4 Alternative B

Impact Analysis – Under alternative B a number of changes would be made that would improve the visual quality of the marina area. Of most significance would be the elimination of some facilities and restoration of these sites. These include mobile homes and dorms, cabins and the Lake Powell Motel.

Also of positive visual effect would be the improved relocation, reduction and/or screening of certain facilities. These include the construction area and dry boat storage.

Also, remodeling of the gas station is proposed under this alternative.

Alternative B would also provide new facilities, including:

- launch ramp overflow parking addition across from the Stateline Launch Ramp
- new visitor contact station

These additions would be somewhat evident to a visitor, but consistent with the developed setting at Wahweap and Class III Visual Management designation. As a result, impacts would be adverse, minor and long term. Overall impacts under this alternative, however, would be minor to moderate, beneficial and long term due to the offsetting beneficial effects of removing certain existing facilities. No impairment of park resources would result from implementation of this alternative.

Cumulative Effects – Cumulative effects would be negligible to beneficial given the lack of other reasonable foreseeable projects within this viewshed.

Conclusion – The overall effect of the changes proposed under this alternative would be beneficial from a visual standpoint if they were accomplished using best management practices, and the materials and treatments of the new structures and screening are compatible with the colors and forms emerging through recent new (and planned) southwestern style construction.

4.10.5 Alternative C (Preferred Alternative)

Impact Analysis – Alternative C would result in some improvements to the visual condition of the marina area. Beneficial visual impacts of greatest significance would result from the removal and site restoration of the following facilities:

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- mobile homes
- dorms (over time)
- Lake Powell Motel

Under this alternative, a number of facilities would be reduced in size, remodeled/renovated and/or screened. These include:

- gas station (remodel)
- fish cleaning station (renovate)
- dry boat storage (relocate and screen)
- construction area (relocate and screen)
- commercial laundry facility (relocate outside NRA)
- NPS storage yard (screen)

Some additional facilities will also be added or expanded. They include:

- launch ramp overflow parking addition across from the Stateline Launch Ramp
- visitor contact station (expand at District Ranger Office)
- Wahweap Lodge (additional rooms and meeting area)
- fee station (upgrade)

Overall effects to the visual quality and character would be moderate and minor to beneficial as a result of the implementation of alternative C.

Cumulative Effects – Cumulative effects would be negligible to beneficial given the lack of other reasonable foreseeable projects within this viewshed.

Conclusion – For the most part, the facility enhancements associated with this alternative would be visible, but not to a level that they would become an evident change to the landscape. Long-term impacts associated with these enhancements, therefore, would be considered as long term and negligible. This assumes that best management practices would be utilized, and the materials and treatments of the new structures and screening are compatible with the colors and forms emerging through recent new (and planned) southwestern style construction. Considering other actions associated with this alternative, particularly the removal of several existing facilities, the overall long-term impact is beneficial. No impairment of visual resources would result from implementation of this alternative.

4.11 SOCIOECONOMICS

4.11.1 Regulation and Policy

Current laws and policies require that the following conditions be achieved in Glen Canyon NRA for economics and socioeconomics.

Desired Conditions	Sources
Public participation in planning and decision-making ensures that the National Park Service fully understands and considers the public's interests in Glen Canyon NRA, which is part of their national heritage, cultural traditions and community surroundings. The service actively seeks out and consults with existing and potential visitors, neighbors, people with traditional cultural ties to national recreation area lands, scientists and scholars, concessioner, cooperating associations, gateway communities, other partners and government agencies.	NPS <i>Management Policies</i> .
The service works cooperatively with others to improve the condition of Glen Canyon NRA to enhance public service; and to integrate the national recreation area into sustainable ecological, cultural and socioeconomic systems.	NPS <i>Management Policies</i> .
In the spirit of partnership, the service seeks opportunities for cooperative management agreements with state or local agencies that will allow for more effective and efficient management of Glen Canyon NRA.	NPS <i>Management Policies</i> . National Parks Omnibus Management Act of 1998, Section 802.
Possible conflicts between alternatives and land use plans, policies or controls for the area concerned (including those of local and state governments and Indian tribes) and the extent to which the national recreation area will reconcile the conflict are identified in environmental documents.	National Environmental Policy Act.

4.11.2 Methodology

In evaluating the impacts on socioeconomic resources, commercial operations within the NRA, in adjacent communities and in the region were considered. It is difficult to establish definitive figures and costs associated with each impact topic. Therefore, a more general discussion of the impacts on socioeconomic resources is included in the consequences section.

Negligible. No effects would occur or the effects on socioeconomic conditions would be below or at the level of detection. The effect would be slight and no long-term effects on socioeconomic conditions would occur.

Minor. The effects to socioeconomic conditions would be detectable. Any adverse or beneficial effects would be small. If mitigation were needed to offset potential adverse effects, it would be simple and successful.

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Moderate. The effects on socioeconomic conditions would be readily apparent and likely long term. Any adverse or beneficial effects would result in changes to socioeconomic conditions on a local scale. If mitigation is needed to offset potential adverse effects, it could be expensive, but would likely be successful.

Major. The effects on socioeconomic conditions would be readily apparent, long term and would cause substantial adverse or beneficial changes to socioeconomic conditions in the region. If mitigation measures were required to offset potential adverse effects, they would be expensive and their success could not be guaranteed.

4.11.3 Alternative A (No-Action Alternative)

Impact Analysis – No changes to existing facilities or housing would be proposed under alternative A. Minor impacts to socioeconomic conditions under alternative A would result from maintaining the current conditions, which would provide various services and opportunities to users of the recreation area. Continued attraction of visitors to the area would help to support the businesses at Wahweap and nearby Page, Arizona.

Cumulative Impacts – The area of influence for the analysis of cumulative effects is defined as the immediate Wahweap Marina and Page, Arizona area. Other marinas in the area as well as the city of Page offer similar amenities as those found at Wahweap. Some economic benefit would result from the slow but continual rise in visitation to the area.

Conclusion – Alternative A would have a long-term, negligible, beneficial impact on socioeconomic conditions in the Wahweap area due to continued visitation to the area helping to maintain the economy.

4.11.4 Alternative B

Impact Analysis – Approximately 30 Category I employees would be housed at the NRA in this alternative, 245 less than currently and the projected demand outlined in the 1998 DCP. These employees would primarily include seasonal employees living in the dormitories. These employees would have to find alternative housing in the City of Page, Greentown and Big Water, and would mainly need rental housing. Very little rental housing is available and most lease terms are one year. Given the seasonal demand pattern, new construction that would appeal to park employees may be difficult to justify from a return on investment perspective, as year-round (12-month) occupancy appears difficult to obtain (NPS 2002a). Adverse impacts to employees could be mitigated by offsets in housing costs or wages. The concessioner would also work with the City of Page and willing developers to ensure the availability of housing to meet this new market demand.

This alternative proposes to remove the Lake Powell Motel. These improvements would concentrate the meeting and lodging facilities either at Wahweap Marina or in the City of Page. If visitation increases, this would increase the demand for the 25 motels with more than 1,500 units in the City of Page. Economic benefits would result from increased visitors to the local area due to improved facilities at Wahweap, such as the new visitor contact station. Economic benefits would occur from construction activities at Wahweap and nearby

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communities, increased demand for goods and services from employees living in adjacent communities, and the increased demand for private housing in these areas. The result would benefit the local economy from increased revenues in the retail, housing and service sectors. Additional jobs would result in an area with an increasing unemployment rate.

Cumulative Impacts – The City of Page has increased in population over the past several years. As a result, additional housing and infrastructure has been built to support the growing population. The cumulative impact of increasing housing demand in the Page area would be that additional housing that was planned in the future may be built sooner to accommodate the demand. Businesses providing construction services and material are present in Page and they could easily adjust to the additional demand.

Conclusion – Alternative B would have a long-term, moderate, beneficial impact on socioeconomic conditions in the Wahweap area due to increased demand for private housing, increases in sales tax revenue, and income generated from rent for Page and the surrounding area. Alternative B would also have a long-term, moderate, adverse impact on seasonal workers having to find rental housing in adjacent local communities. This could be mitigated by a concessioner housing assistance program or adjustments in wages.

4.11.5 Alternative C (Preferred Alternative)

Impact Analysis – Approximately 205 Category I and II employees would be housed in this alternative, 70 less than current conditions and the projected demand outlined in the 1998 DCP. Many of these employees are currently living in trailers that would be removed from the housing area. These employees would have to find alternative housing in the City of Page, Greenhaven and Big Water. Permanent housing in these communities is available or would be constructed if market demand warranted. Currently, very little new housing is being constructed. Vacancy rates exceeding 13 percent increase the availability of existing housing stock. However, with the medium home value in Page averaging \$138,000, affordability is a concern. New housing is often targeted as vacation homes for people outside the area (NPS 2002a). Adverse impacts to employees could be mitigated by offsets in housing cost or wages. The concessioner would also work with the City of Page and willing developers to ensure the availability of housing to meet the housing type and affordability of this new market demand.

This alternative proposes to remove the Lake Powell Motel and replace the lost rooms by expanding Wahweap Lodge. Conference facilities at Wahweap Lodge would also be expanded. The closest alternative lodging and conference facilities (Marriott Hotel) are located in the City of Page. These improvements would concentrate meeting and lodging facilities either at Wahweap Marina or in the City of Page. The maintenance of the existing number of rooms at Wahweap and the expansion of conference room facilities would not noticeably affect the 25 motels with more than 1,500 units and seven meeting facilities.

Beneficial economic impacts from this alternative would offset negative impacts. The improved facilities at Wahweap, such as the new visitor contact station, would support the current trend in visitation to the area. New food services would be located in both the States of Utah and Arizona, generating additional sales tax revenue. Other benefits result from

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moving facilities, such as the commercial laundry operation and housing, from the NRA to surrounding communities. Economic benefits would occur from construction activities, the demand for goods and services in adjacent communities, and the increased demand for private housing in those same areas. The result would be benefits to the local economy from increased revenues in the retail, housing and service sectors. Additional jobs would result in an area with an increasing unemployment rate.

Cumulative Impacts – Cumulative impacts of this alternative are similar to those presented in alternative B.

Conclusion – Alternative C would have a long-term, moderate, beneficial impact on socioeconomic conditions in the Wahweap area due to increased demand for private housing, increase in sales tax, and income generated from rent for Page and the surrounding area. Alternative C would also have a long-term, minor, adverse impact on permanent workers having to find housing in adjacent local communities.

4.12 CULTURAL RESOURCES

4.12.1 Regulation and Policy

The National Park Service's primary interest in these places stems from its responsibilities under the following legislation:

The NPS Organic Act — responsibility to conserve the natural and historic objects within parks unimpaired for the enjoyment of future generations.

The Antiquities Act of 1906 (P.L. 209) — authorizes the president to establish historic landmarks and structures as monuments owned or controlled by the U.S. government and instituted a fine for unauthorized collection of their artifacts.

The National Historic Preservation Act of 1966 (16 USC 470, et seq.) requires that federal agencies with direct or indirect jurisdiction over undertakings take into account the effects of those undertakings on properties that are listed on, or eligible for listing on, the National Register of Historic Places (section 106). Section 110 requires that programs be established in consultation with the states to identify, evaluate, and nominate properties to the national register.

American Indian Religious Freedom Act — responsibility to protect and preserve for American Indians access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

Archeological Resources Protection Act — responsibility to secure, for the present and future benefit of the American people, the protection of archeological resources and sites that are on public lands.

Executive Order 13007 — responsibility to (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and (2) avoid adversely affecting the physical integrity of such sacred sites.

In accordance with the *Management Policies 2001*, the NPS must be respectful of these ethnographic resources, and carefully consider the effects that NPS actions may have on them (*Management Policies 2001*, sec. 5.3.5.3). Specific guidance for the management of cultural resources is provided in *NPS-28: Cultural Resource Management Guidelines* (NPS 1998c NPS-28).

4.12.2 Methodology

Impacts to cultural resources are described in terms of type, context, duration and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality (CEQ 1978) that implement the National Environmental Policy Act. These impact analyses are also intended to comply with the requirements of both the National Environmental Policy Act and Sections 106 and 110 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing Sections 106 and 110 of the National Historic Preservation Act (36 CFR Part 800, Protection of Historic Properties), impacts to cultural resources were identified and evaluated by:

- determining the area of potential effects
- identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places
- applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register
- considering ways to avoid, minimize or mitigate adverse effects

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register. For example, this could include diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling or association. Adverse effects also include reasonably foreseeable effects caused by the alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register. Council on Environmental Quality regulations (CEQ 1978) and *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001b) call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential effect, such as reducing the intensity of an impact from major to moderate or minor. Any resulting reduction in intensity

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of impact by mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Although adverse effects under section 106 may be mitigated, the effect remains adverse.

In this environmental assessment impacts to cultural resources (archeological resources, historic structures, the cultural landscape, and ethnographic resources) are described in terms of type, context, duration, and intensity, which is consistent with the Council on Environmental Quality (CEQ) regulations. These impact analyses are intended, however, to comply with the requirements of both the *National Environmental Policy Act* and Section 106 of the *National Historic Preservation Act* (NHPA). In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 (36 CFR 800, "Protection of Historic Properties"), impacts to cultural resources were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed on or eligible to be listed on the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed on the national register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the advisory council's regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected, national register eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies for inclusion on the national register (e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR 800.5, "Assessment of Adverse Effects"). A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion on the national register.

The CEQ regulations and DO-12 also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g., reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation only under the National Environmental Policy Act. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Although adverse effects under section 106 may be mitigated, the effect remains adverse.

A section 106 summary is included at the end of the analysis section and is intended to meet the requirements of the National Historic Preservation Act. It also is intended to provide an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based on criteria found in the advisory council's regulations.

Impact Threshold Definitions

Historic Structures/Buildings – To be listed in the National Register of Historic Places, a structure or building must meet the following criteria:

- Be associated with an important historic context. That is, it must possess significance such that a meaning or value is ascribed to the structure or building.
- Have integrity of those features necessary to convey its significance. Typically, these would include locations, design, setting, workmanship, materials, feeling, and national association.

Complete information on criteria for listing is included in National Register Bulletin #15 (NPS 2002d), *How to Apply the National Register Criteria for Evaluation*. Impact thresholds for historic structures and buildings are defined below.

Negligible: The impact is at the lowest level of detection or barely measurable, with no perceptible consequences, either adverse or beneficial, to the historic resources. For purposes of section 106, the determination of effect would be *no adverse effect*.

Minor: Adverse Impact — Impact would not affect the character-defining features of a National Register of Historic Places-eligible or -listed structure or building. For purposes of section 106, the determination of effect would be *no adverse effect*.

Beneficial impact — Stabilization/preservation of character-defining features occurs in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1995a) to maintain existing integrity of a structure or building. For purposes of section 106, the determination of effect would be *no adverse effect*.

Moderate: Adverse Impact — Impact alters character-defining features of the structure or building but does not diminish the integrity of the resource to the extent that its national register eligibility is jeopardized. For purposes of section 106, the determination of effect would be *adverse effect*.

Beneficial impact — Rehabilitation of a structure or building occurs in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1995a) to make possible a compatible use of the property while preserving its character-defining features. For purposes of section 106, the determination of effect would be *no adverse effect*.

Major: Adverse Impact — The impact alters a character-defining feature of the structure or building, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the national register. For

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purposes of section 106, the determination of effect would be *adverse effect*.

Beneficial impact — Restoration occurs in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1995a) to accurately depict the form, features, and character of a structure or building as it appeared during its period of significance. The section 106 determination of effect would be *no adverse effect*.

Impairment: A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Glen Canyon NRA; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant NPS planning documents.

Archeological Resources – Certain important research questions about human history can only be answered by the actual physical material of cultural resources. Archeological resources have the potential to answer, in whole or in part, such research questions. An archeological site(s) can be eligible to be listed on the National Register of Historic Places if the site(s) has yielded, or may be likely to yield, information important in prehistory or history. An archeological site(s) can be nominated to the national register in one of three historic contexts or levels of significance: local, state, or national (see National Register Bulletin #15, *How to Apply the National Register Criteria for Evaluation*) (NPS 2002b). For purposes of analyzing impacts to archeological resources, thresholds of change for the intensity of an impact are based upon the potential of the site(s) to yield information important in prehistory or history, as well as the probable historic context of the affected site(s):

Negligible: The impact is at the lowest level of detection or barely measurable, with no perceptible consequences, either adverse or beneficial, to the cultural resources. For purposes of section 106, the determination of effect would be *no adverse effect*.

Minor: **Adverse Impact** — The impact would affect a cultural resource archeological site with the potential to yield information important in prehistory or history. The historic context of the affected site(s) would be local. For purposes of section 106, the determination of effect would be *adverse effect*.

Beneficial impact — A site would be preserved in its natural state. For purposes of section 106, the determination of effect would be *no adverse effect*.

Moderate: **Adverse Impact** — The impact would affect an archeological site with the potential to yield information important in prehistory or history. The historic context of the affected site would be statewide. For purposes of section 106, the determination of effect would be *adverse effect*.

Beneficial impact — The site would be stabilized. For purposes of section 106, the determination of effect would be *no adverse effect*.

Major: Adverse Impact — The impact would affect an archeological site with the potential to yield important information about human history or prehistory. The historic context of the affected site would be national. For purposes of section 106, the determination of effect would be *adverse effect*.
Beneficial impact — Active intervention would be taken to preserve the site. For purposes of section 106, the determination of effect would be *no adverse effect*.

Impairment: A major, adverse impact to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Glen Canyon NRA; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant NPS planning documents. Project inventories and mitigation would still be conducted. However, without a systematic monitoring program and given the potential access concerns, there would continue to be a risk of some unavoidable adverse impacts.

Durations of Impacts on Cultural Resources – Impact on virtually all cultural features other than vegetation components would be long-term effects because most cultural resources are non-renewable. These would include any effects on archeological (prehistoric or historic) or historic resources.

Short-term impacts would involve such things as treatment effects on the natural elements of a cultural landscape that would extend for no more than about 5 years. Examples would include the restoration of historic planting or the regrowth of vegetation.

Impact Analysis Area – In terms of development activity, the appropriate boundary for analyzing cultural resource impacts includes the location of the Wahweap Trailer Village Cabins and other locations within the developed portion of Wahweap.

4.12.3 Alternative A (No-Action Alternative)

Analysis – Under this alternative, the Wahweap Trailer Village Cabins and the Lake Powell Motel would be retained. The cabins would not be open for public viewing. Implementation of the no-action alternative would result in a minor-to-moderate beneficial impact in the short and long term for historic resources. This alternative would result in negligible beneficial impacts over the short and long term for prehistoric archeological sites by reducing the potential for illegal collection or damage attributable to visitors.

Cumulative Impacts – On a cumulative basis, potential visitor impacts from illegally collecting or damaging resources that are readily accessible would continue at negligible to minor adverse levels.

Conclusion – Retaining the Wahweap Trailer Village Cabins would have a minor-to-moderate beneficial impact in the short and long term. Under this alternative, negligible to

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minor adverse impacts, over the short and long term, would result for prehistoric archeological resources based on illegal collecting or prehistoric resource damage. Implementation of this alternative would not result in an impairment of cultural resources.

4.12.4 Alternative B

Analysis – Under this alternative, the Wahweap Trail Village Cabins would be documented and removed. The appropriate level of mitigation documentation would be determined collaboratively between the Arizona State Historic Preservation Officer, the park, the Inter Mountain Regional Office, National Park Service, prior to the removal of the Wahweap Trail Village Cabins. While removal of the cabins would be a moderate, adverse action in the short and long term, recordation of the structures would serve as a form of mitigation. Should the Arizona SHPO concur with the park finding that the motel is not eligible for listing on the National Register of Historic Places, removal of the Lake Powell Motel would have no effect.

Archeological Resources – Known archeological resources (AZ C:2:16; AZ C:2:17; AZ C:2:18; AZ C:2:19; AZ C:3:05; AZ C:2:23; AZ C:2:05; and 42 KA02008) would be avoided during construction. Potential for effects to prehistoric archeological resources would be negligible to minor adverse. An archeologist would be on site during construction to ensure that potential subsurface deposits were either not disturbed or appropriately documented and recovered.

Potential impacts directly attributable to visitors are difficult to quantify. The most likely impact to archeological sites (aside from construction) would be visitors illegally collecting or damaging artifacts. Looting and vandalism of cultural resources is not a substantial problem at this site. Under this alternative, visitors are expected to have a minor, adverse impact on listed or potentially listed archeological or historic resources.

Historic Resources – The Wahweap Trail Village Cabins are considered eligible for listing on the National Register of Historic Places under Criterion A. Under this alternative, the cabins would be removed after mitigation is determined jointly between the park and the Arizona SHPO and completed by the park. Although considered a major, adverse impact, this alternative does not result in a finding of impairment because the cabins are not necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Glen Canyon NRA; key to the cultural integrity of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents. The park is seeking concurrence from the Arizona SHPO on the finding that the Lake Powell Motel is not eligible for listing on the National Register of Historic Places. Should the Arizona SHPO concur, removal of the Lake Powell Motel would have no effect.

Cumulative Impacts – On a cumulative basis, removal of the cabins would result in a major, adverse action. Known archeological resources would be avoided during construction, resulting in a negligible-to-minor beneficial impact. On a cumulative basis, potential visitor impacts from illegally collecting or damaging resources prehistoric resources would continue and likely still experience minor adverse impacts over the short and long term.

Conclusion – Removal of the cabins would result in a major, adverse action over the short and long term. Should the Arizona SHPO concur, removal of the Lake Powell Motel would have no effect. While known archeological resources would be avoided during construction potential visitor impacts would continue resulting in a negligible-to-minor adverse impact over the short and long term to prehistoric resources. Implementation of this alternative would not result in an impairment of cultural resources.

4.12.5 Alternative C (Preferred Alternative)

Analysis – Under this alternative, known archeological resources would be avoided whenever possible during construction. The Wahweap Trailer Village Cabins would be retained with a restored native landscape. The cabins would not be open for public viewing. The Lake Powell Motel would be removed and the disturbed areas revegetated with native plants.

Archeological Resources – Eight known prehistoric archeological sites are within the project area could be affected: AZ C:2:16; AZ C:2:17; AZ C:2:18; AZ C:2:19; AZ C:3:05; AZ C:2:23; AZ C:2:05; and 42 KA02008. Efforts to avoid each would be taken during construction. Potential for effects to prehistoric archeological resources would be negligible to minor beneficial. Prior to construction, an archeological survey would be conducted within the project area to identify potential archeological resources. Artifacts identified would be preserved and curated according to NPS and State Historic Preservation Officer requirements. An archeologist would be on site during construction to ensure that potential subsurface deposits were either not disturbed or appropriately documented and recovered.

Potential impacts directly attributable to visitors are difficult to quantify. The most likely impact to archeological sites (aside from construction) would be visitors illegally collecting or damaging artifacts. Looting and vandalism of cultural resources is not a substantial problem at this site. Under this alternative, visitors are expected to have a minor, adverse impact on listed or potentially listed archeological or historic resources.

Historic Resources – The Wahweap Trail Village Cabins are considered eligible for listing on the National Register of Historic Places under Criterion A. Under this alternative, the cabins would be retained with a restored native landscape. The cabins would not be open for public viewing. The park is seeking concurrence from the Arizona SHPO on the finding of not eligible for the Lake Powell Motel.

Cumulative Impacts – On a cumulative basis, minor, adverse impacts from visitors illegally collecting or damaging resources that are readily accessible would continue over the long and short term.

Conclusion – This alternative would have direct and in-direct, short- and long-term, negligible-to-minor, beneficial effects on prehistoric archeological and historic resources. There would also be minor adverse impacts from visitors illegally collecting or damaging resources. Implementation of this alternative would not result in an impairment of cultural resources.

Section 106 Summary

This environmental assessment provides detailed descriptions of three alternatives (including a No-Action alternative) and analyzes the potential impacts associated with possible implementation of each alternative. This summary is specific to the alternative C (Preferred).

Visitors access areas of the recreation area by many transport modes, including motor vehicles, in boats of all types, and by hiking. Because of this diversity of modes of access, the impacts on archeological cultural resources directly attributable solely to visitors are difficult to define. Boaters and land-based user groups would have access to remote areas with potentially listed archeological sites. On a cumulative basis all visitor activities could result in minor to major adverse impacts on those resources that are readily accessible, due to the number of visitors and potential for looting or vandalism. Resources in more remote areas that are not as readily accessible to visitors would likely still experience minor adverse impacts on a cumulative basis, but to a lesser degree. All impacts levels would continue at existing levels.

In cases where it was determined there was a potential for adverse impacts (as defined in 36 *Code of Federal Regulations* 800) to cultural resources listed on or eligible for listing on the National Register of Historic Places, the NPS would coordinate with the state historic preservation officer of Arizona to determine the level of effect on the property, and to determine what mitigation would be needed.

Glen Canyon NRA staff would continue to educate visitors regarding archeological and ethnographic site etiquette to provide long-term protection for surface artifacts, architectural features, and traditional activities. If necessary, additional mitigation measures would be developed in consultation with the state historic preservation officer and concerned Native American tribes. The park would provide similar educational opportunities to visitors regarding the conservation of historic resources.

Concerned Native American tribes will receive copies of this environmental assessment for review and comment. This environmental assessment will also be sent to the state historic preservation officer for Arizona and to the Advisory Council on Historic Preservation for review and comment as part of the section 106 compliance process.

Pursuant to 36 *Code of Federal Regulations* Part 800.5, implementing regulations of the National Historic Preservation Act (revised regulations effective January 2001), addressing the criteria of effect and adverse effect, the NPS finds that the implementation of the preferred alternative in Glen Canyon NRA, with identified mitigation measures, would be beneficial, and would not result in any new adverse effects (*no adverse effect*) to archeological, historic, ethnographic, or cultural landscape resources currently identified as eligible for or listed on the National Register of Historic Places.

4.13 PARK OPERATIONS

4.13.1 Regulation and Policy

Current laws and policies require that the following conditions be achieved in Glen Canyon NRA for operations.

Desired Conditions	Sources
Utilities within the national recreation area will be as unobtrusive as possible and will have the least possible resource impact.	<i>NPS Management Policies.</i>
The National Park Service will use municipal or other utility systems outside of the national recreation area whenever economically and environmentally practicable.	<i>NPS Management Policies.</i>
The National Park Service will use the least polluting power supply options, either through on-site generation or through power purchases, where appropriate, available and cost effective; or where such purchases help meet federal or state emissions goals or alternative energy goals.	<i>NPS Management Policies.</i>

4.13.2 Methodology

Impact thresholds are listed below.

Negligible: Park operations would not be affected or the effect would be at or below the lower levels of detection, and would not have an appreciable effect on monument operations.

Minor: The effect would be detectable and likely short term, but would be of a magnitude that would not have an appreciable effect on monument operations. If mitigation were needed to offset adverse effects, it would be relatively simple and likely successful.

Moderate: The effects would be readily apparent, be long term, and would result in a substantial change in monument operations in a manner noticeable to staff and the public. Mitigation measures would probably be necessary to offset adverse effects and likely would be successful.

Major: The effects would be readily apparent, long term, would result in a substantial change in monument operations in a manner noticeable to staff and the public, and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.

4.13.3 Alternative A (No-Action Alternative)

Impact Analysis – Minor benefits to park operations would occur from plans already under construction, such as the construction of the new fire station and the relocation of some of the visitor RV sites. Visitation is expected to continue at current levels. An increase in use of the camping area would occur due to the new facilities. Additional demands on concessioner staff would be required to service this area.

Cumulative Impacts – Past and current projects that contribute towards beneficial impacts are the Wahweap wastewater treatment system upgrades, which increase the efficiency of operation in the area and improvements to other facilities on Lake Powell.

Conclusion – Long-term, negligible, beneficial impacts to park operations would occur from improvements under construction.

4.13.4 Alternative B

Impact Analysis. Adverse impacts to park operations under this alternative would be from ongoing increases in visitation and additional facilities. Additional demands on existing concessioner staff would be required and additional staff may need to be employed. This would be offset by improvements to park operations from the following:

- Removal of all but Category I housing from employee housing area
- Improvements to Stateline Launch Ramp and adjacent parking
- New visitor contact station
- New fire station
- Relocation of the visitor RV sites

A new visitor contact station would also act as a fee station during off season. This contact station would also provide visitors with the rules and regulations that apply at Wahweap. Fewer employees would be necessary to operate and monitor the employee housing areas due to the reduction of housing and the removal of the visitor RV sites. In addition, less wastewater would be transferred from Wahweap to Page. Less congestion would also be expected at the Wahweap Marina, as visitors would be relocated to the Stateline Launch Ramp area.

Cumulative Impacts – Cumulative impacts would be the same as alternative B.

Conclusion – Park operations would have long-term, minor-to-moderate, beneficial impacts and moderate adverse impacts. Adverse impacts would include the logistics involved with additional public use facilities and increased visitation. Beneficial impacts would include enhancing operations and facilities.

4.13.5 Alternative C (Preferred Alternative)

Impact Analysis – Adverse impacts to park operations under this alternative would be from ongoing increases in visitation and additional facilities. Additional demands on existing concessioner staff would be required and additional staff may need to be employed. This would be offset by improvements to park operations from the following:

- Removal of all but Category I and II housing from employee housing area
- Improvements to Stateline Launch Ramp and adjacent parking
- New visitor contact station
- New fire station
- Relocation of the visitor RV sites
- Development of a recycling transfer station
- Improved fee stations
- A new shuttle
- Removal of Lake Powell Motel and expansion of Wahweap lodge
- Additional lodging unit added to the Wahweap Lodge
- Relocation of commercial laundry facility outside the NRA

Visitors would be concentrated at two activity nodes, Stateline and Wahweap Launch Ramps. Improvements to the Stateline area would include additional parking, a new food service facility and ramp improvements, and the relocation of dry boat storage would help disperse and manage visitor use. Visitor movement between the two locations would be enhanced by the operation of a shuttle during peak periods.

Other improvements would help reduce the need for staff. The removal of Lake Powell Motel and the expansion of the Wahweap Lodge would concentrate all lodging activities in one location. Fewer employees would also be necessary to operate and monitor the employee housing areas due to the reduction of housing, the removal of the visitor RV sites, and the relocation of dry boat storage.

Other improvements would enhance operational efficiency. A new visitor contact station would provide a centralized location to provide visitors with valuable information. Improved fee stations would provide a better and safer environment for NPS employees. Recycling activities would be improved by the addition of a new transfer station.

Cumulative Impacts – Cumulative impacts are similar to those described in alternative B.

Conclusion – Park operations would have long-term, minor to moderate, beneficial impacts. Beneficial impacts would include enhancing operations and facilities at boat launch ramp, dry boat storage closer to the launch area, and construction of an improved fee station.

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4.14 PUBLIC SAFETY

4.14.1 Regulation and Policy

Desired Conditions	Sources
A safe and healthful environment is provided for visitors and employees.	NPS <i>Management Policies</i> .
Toxic and flammable chemicals are stored, used and disposed of properly so that accidental releases are prevented and the severity of releases that do occur is minimized. The national recreation area will have an oil and chemical spill response management plan.	Resource Conservation and Recovery Act. NPS <i>Management Policies</i> .

4.14.2 Methodology

Impacts on public safety were assessed by gathering information on public use at the Wahweap area from NPS staff at Glen Canyon NRA and by using professional judgment, and were based on experience with similar projects. The following definitions were used in the assessment of impacts on public safety in the Wahweap area:

Negligible: Public health and safety would not be affected or the effects would be at low levels of detection and would not have an appreciable adverse effect on public safety.

Minor: Effects would be detectable but would not have an appreciable adverse or beneficial effect on public safety. If mitigation were needed, it would be relatively simple and would likely be successful.

Moderate: The impact on visitor safety would be sufficient to cause a permanent adverse change in accident rates at existing low accident locations or create the potential for additional visitor conflicts in areas that currently do not exhibit noticeable visitor conflict trends. Mitigation measures may be necessary and would likely be successful.

Major: The impact on visitor safety would be substantial, either through the elimination of potential hazards or the creation of new areas with a high potential for serious accidents or hazards.

4.14.3 Alternative A (No-Action Alternative)

Impact Analysis – Public safety in the Wahweap area would be enhanced by the construction of a new fire station. The approved campground design has also considered elements of public safety such as crosswalks.

Cumulative Impacts – The area of influence for the analysis of cumulative effects is defined as the immediate Wahweap Marina area.

Conclusion – Long-term, negligible, beneficial impacts to public safety would occur due to planned improvements.

4.14.4 Alternative B

Impact Analysis – Public safety in the Wahweap area would be enhanced by the construction of a new fire station. Construction of new facilities would help to disperse visitors, preventing congestion.

Cumulative Impacts – Cumulative impacts to public safety in addition to the new fire station include enhancement of the wastewater treatment system, which protects public health from the standpoint of the negative effects of water pollution.

Conclusion – Alternative B would have long-term, minor, beneficial and adverse effects. Adverse effects are due to greater numbers of people and vehicles at the campground. Overall, however, effects would be beneficial and would result from an improvement of site facilities and by dispersion of visitors to key activity centers.

4.14.5 Alternative C (Preferred Alternative)

Impact Analysis – Impacts under this alternative are similar to those described in alternative B.

Cumulative Impacts – Cumulative Impacts under this alternative are similar to those described in alternative B.

Conclusion – Alternative C would have long-term, minor, beneficial and adverse effects. Adverse effects are due to greater numbers of people and vehicles at the campground. Overall, however, effects would be beneficial and would result from an improvement of site facilities and by dispersion of visitors to key activity centers.

4.15 TRANSPORTATION AND TRAFFIC

4.15.1 Regulation and Policy

Current laws and policies require that the following conditions be achieved in Glen Canyon NRA for public health and safety, including transportation:

Desired Conditions	Sources
A safe and healthful environment is provided for visitors and employees.	<i>NPS Management Policies.</i>
Toxic and flammable chemicals are stored, used and disposed of properly so that accidental releases are prevented and the severity of releases that do occur is minimized. The national recreation area will have an oil and chemical spill response management plan.	Resource Conservation and Recovery Act. <i>NPS Management Policies.</i>

4.15.2 Methodology

The following definitions of intensity were used for the analysis of impacts on transportation and traffic:

Negligible: Impacts would not include measurable or perceptible changes in transportation routes or traffic volumes.

Minor: Changes to traffic volumes would be anticipated to be less than 25 percent, with only slight changes to transportation routes (e.g., paving or realignment). New or improved roads and traffic devices consistent with expected traffic would be implemented to mitigate traffic volume increases in excess of 25 percent.

Moderate: Changes to traffic volumes would be anticipated to be between 26 percent and 75 percent, and changes to transportation routes would include new roads and traffic devices to partially mitigate for additional traffic.

Major: Changes to traffic volumes would be anticipated to be greater than 75 percent, and changes to transportation routes would include substantial new roads (greater than 50 percent increase to total road length over current conditions); new roads and traffic devices would not adequately mitigate for increased traffic volumes.

4.15.3 Alternative A (No-Action Alternative)

Impact Analysis – Under this alternative, traffic would continue to increase with visitation over time. Additionally, a decrease in RV vehicle travel may result from their translocation to the campground areas and closer to other facilities of the area.

Cumulative Impacts – The area of influence for the analysis of cumulative effects is defined as the immediate Wahweap Marina area. No other impacts would contribute to cumulative impacts.

Conclusion – Long-term, negligible, adverse impacts to transportation and traffic operations would occur due to continued visitation to the area.

4.15.4 Alternative B

Impact Analysis – Under this alternative, traffic would continue to increase with visitation over time due to attraction to improved facilities in the area.

Cumulative Impacts – The area of influence for the analysis of cumulative effects is defined as the immediate Wahweap Marina area. As improvements continue at Wahweap traffic congestion will increase.

Conclusion – Alternative B would have long-term, minor, beneficial and adverse effects. Adverse effects are due to greater numbers of people and vehicles at the campground. Overall, however, effects would be beneficial and would result from an improvement of site facilities and by dispersion of visitors to key activity centers.

4.15.5 Alternative C (Preferred Alternative)

Impact Analysis – Impacts are similar to those described in alternative B. However, the dispersion of use between the Stateline and Wahweap Launch Ramp and the addition of a shuttle will reduce traffic congestion.

Cumulative Impacts – See alternative B.

Conclusion – Alternative C would have long-term, minor, beneficial and adverse effects. Adverse effects are due to greater numbers of people and vehicles due to new facilities. Overall, however, effects would be beneficial and would result from an improvement of site facilities and by dispersion of visitors to key activity centers.

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5.0 Consultation and Coordination

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5.0 CONSULTATION AND COORDINATION

5.1 INTRODUCTION



During the planning process for this environmental assessment (EA), formal and informal efforts were made by the National Park Service (NPS) to involve other federal agencies, state and local governments, Navajo Nation chapters, and the public. The NPS initiated the EA process by requesting comments to determine the scope of issues and concerns that needed to be addressed during the EA process. A public scoping workshop was conducted in January, 2003. A second public open house was held in May, 2003.

The NPS's Native American began Native American consultation in February 2003 and presented information about the project to members of six Navajo Nation chapters at regular meetings. A summary of these meetings is presented in appendix A. Also as part of the resource inventory, various agencies have been contacted to request data to supplement and update the information available in the previous EA (completed with the Development Concept Plan [DCP] for Wahweap) (NPS 1998b). This section describes these efforts, including the formal consultation required and the public involvement activities that were conducted. Section 5.4 provide lists of individuals involved with preparation and review of the document, and recipients of this EA, respectively.

5.2 AGENCY CONSULTATION

5.2.1 Special-Status Species

The Endangered Species Act of 1973, as amended (16 USC 1531 et seq.), requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat. The NPS requested a list of federally endangered and threatened species that may be present at the Wahweap site from the USFWS (see appendix D). The USFWS Arizona Ecological Services Field Office Website for Coconino County, Arizona was accessed to obtain a list of potential species in the area as per instructions from the USFWS.

The USFWS will review the special-status species analysis in this EA as part of an ongoing consultation process. All consultation requirements will be fulfilled, as defined by Section 7 of the Endangered Species Act, before a Finding of No Significant Impact can be signed.

5.2.2 Cultural Resources

The National Park Service Cultural Resource Management Program operates in accordance with Section 106 of the National Historic Preservation Act (NHPA) and 36 CFR Part 800, and other laws, regulations, and policies. In accordance with the NHPA, efforts were made to identify and consider traditional cultural places. Traditional cultural places are ethnographic resources that are eligible for inclusion in the National Register of Historic Places because of their



association with cultural practices or beliefs of a living community that are (1) rooted in that community's history, and (2) important in maintaining the continuing cultural identity of the community. Five cultural resource studies have been completed in the Wahweap area, with 17 archeological sites and one traditional cultural property being identified. Construction activities would avoid impacting known cultural resources in compliance with Section 106 of the National Historic Preservation Act and NPS policy (NPS 1998b). The most recent study, the *Wahweap Trailer Village Cabins, A Study to evaluate potential National Register Eligibility 2002*, examines the eligibility of existing structures located within the Wahweap development area. Consultation with the State Historic Preservation Office concerning the cabin's eligibility was completed in June of 2003, with the concurrence of the cabin's eligibility for inclusion in the National Register of Historic Places. Consultation has begun with the State Historic Preservation Office concerning the Lake Powell Motel.

Consultation also began with the Navajo Nation Chapters in February 2003. At each meeting, the Wahweap Development Concept Plan and Environmental Assessment were presented. Background information on the establishment, percentage of visitation it receives, along with a map showing its location was provided to those attending the chapter meeting. The plan issues identified to date along with the overview of process/schedule were presented and explained. People were encouraged to make verbal, written, comments or to visit the project web page. Meetings were held with the following chapters to discuss the project:

- Gap/Bodaway Chapter
- Coppermine Chapter
- Kaibeto Chapter
- Inscription House
- Navajo Mountain Chapter
- LeChee Chapter

The results of these meetings can be found in appendix A.

5.3 PUBLIC INVOLVEMENT ACTIVITIES

The purpose of the scoping process is to identify issues and concerns related to the project and to identify the range of issues to be addressed in the EA. In preparation for scoping, a mailing list of approximately 250 individuals was established. A scoping notice was prepared in January 2003 and mailed to those on the list. The scoping notice included a brief description of the issues and opportunities for public participation (i.e., the upcoming public scoping workshop). The notice referenced the website where readers could obtain more information and send comments. A press release was issued by the NPS, Glen Canyon NRA in January announcing the initiation of the scoping meetings. In January 2003, NPS representatives also broadcasted an announcement with KXAZ, the local Page, Arizona radio station, 293.3 FM.

A public scoping meeting was held on January 22, 2003 at Glen Canyon NRA at the Wahweap Lodge. The public was notified of the meeting through flyers, newspaper and radio ads, and a newsletter. The purpose of the meeting was to describe the project and existing conditions, and gather information. The attendees at the public meeting were asked to visit 5 stations where they could learn more information about key subjects, and provide their input to NPS representatives and the consulting team. Exhibits and topics presented at the meeting stations included:

- meeting sign-in / mailing list sign-up
- park and project orientation
- existing site conditions and highlights from the current Wahweap Development Concept Plan
- visitation statistics and existing operations with defined carrying capacity summary
- future goals and comment station

Attendees provided their input directly on the comment boards, to NPS representatives and consultants. Other comments were received from comment sheets left at the meeting or via the project website. The results on this meeting can be found in appendix A.

An additional newsletter was sent in May, 2003 to approximately 1,500 slip and dry boat storage space holders describing the project and results to-date. A public open house was also held on May 14, 2003 at the Wahweap Lodge to obtain additional public comment on the three alternatives. A newsletter was sent to approximately 300 people, notifying them of the meeting. Exhibits and topics presented at the meeting stations included:

- meeting sign-in / mailing list sign-up
- park and project orientation
- existing site conditions
- project alternatives
- concept diagrams
- future goals and comment station

CONSULTATION AND COORDINATION

Attendees provided their input directly on the comment boards, to NPS representatives and consultants. Other comments were received from comment sheets left at the meeting or via the project website.

5.4 INDIVIDUALS INVOLVED WITH PREPARATION AND REVIEW OF THE DOCUMENT

List of Preparers

National Park Service

Chris Kincaid

Kitty Roberts, Superintendent, Glen Canyon NRA

Bill Pierce, Deputy Superintendent

Liza Ermeling, Landscape Architect, Glen Canyon NRA

Jacki Blais, Concessions Management Specialist, Glen Canyon NRA

Pauline Wilson, American Indian Liaison, Glen Canyon NRA

EDAW, Inc.

Bill Maddux, Air and Noise

Bruce Meighen, ACIP, Project Manager

Craig Severn, Vegetation and Wildlife

Craig Taggart, Visual

Drew Stoll, Geographic Information Systems

Joan DeGraff, Cultural Resources

Linda Spangler, Technical Editing

Mark Peters, Water Quantity and Quality

Paul Mills, Capital Developments

Phil Hendricks, ASLA, Capital Developments

Shelly LaMastra, Capital Developments

Tom Keith, Technical Oversight

List of Recipients

Organizations and agencies contacted for information; or that assisted in identifying important issues, developing alternatives, or analyzing impacts; or that will review and comment upon the environmental assessment are listed below.

Federal Agencies

U.S. Fish and Wildlife Service

Grand Canyon National Park

Bureau of Indian Affairs

Bureau of Reclamation

Environmental Protection Agency

U.S. Army Corps of Engineers

State Agencies

Arizona Department of Environmental Quality
Arizona Department of Public Safety
Arizona Department of Water Resources
Arizona Game and Fish Department
Arizona State Historic Preservation Office
Utah Division of Wildlife Resources
Utah Department of Environmental Quality
Utah Department of Natural Resources

Municipalities / Organizations

City of Page
ARAMARK Sports and Entertainment, Inc.

Individuals

Due to the large number of individuals receiving this EA, their names have not been listed. A full list is available from the National Park Service, Glen Canyon NRA.

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Appendix A – Public Involvement

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A.1 NEWSLETTERS AND PUBLIC SCOPING MEETING SUMMARY



WAHWEAP DEVELOPMENT CONCEPT PLAN & ENVIRONMENTAL ASSESSMENT

In November of 2002, the National Park Service initiated work on a Development Concept Plan (DCP) and Environmental Assessment (EA) for the Wahweap Marina Area. Although the last DCP for this area was prepared fairly recently (1998), an update is needed. The need for an update stems from several factors, including the fact that changes in legislation and unforeseen economic conditions have had a significant impact on operations of the area. One of the plan elements that has been affected by these changes is employee housing. The DCP update will address this important issue, including a determination of the amount of housing required to meet current and future needs as well as a decision on where additional housing should be located.



Even though an update is underway, it should be noted that many elements included in the 1998 DCP have been implemented or are currently underway. These include major upgrades and enhancements to the campground, relocation of visitor RV sites away from the housing area, expansion of parking in the launch ramp area, rehabilitation of the sewage lagoon, and development of a new store.

The new DCP is intended to guide future development of services, facilities and infrastructure for the next 15+ years.

Background

Wahweap lies near the Southwest end of Lake Powell on the border of Kane County, Utah and Coconino County, Arizona. The area lies approximately nine miles north of Page, Arizona and access to the area is provided via US Highway 89. Wahweap is the largest marina and most developed use area within the Park. Visitation at Wahweap is concentrated during the period May through September, when more than 70% of total annual visitation occurs. Facilities currently provided at Wahweap include boat ramps, campgrounds, marina facilities, lodging, food services, gift shop, and a service station.

Public Scoping Meeting

You are invited to attend a scoping meeting on the Wahweap DCP/EA.

The scoping meeting will be held:

January 22, 2003

Wahweap Lodge, Navajo Room

Wahweap Marina (near Page, Arizona)

Glen Canyon National Recreation Area

Time: 5:30 - 7:30 PM (MST)

Plan Issues Identified to Date

Informal public comments and discussions among the planning team have identified the following issues:

- Amount of concession employee housing to be built on site.
- Removal or adaptive reuse of Lake Powell Motel (on US Hwy 89).
- Location of the dry boat storage operation.
- Separate launching area for non-motorized vessels.
- Additional facilities at the marina, including a restaurant.
- Separate staging area for commercial boat operations.
- Facilities to support operations in low water conditions.
- Removal of commercial laundry from within the park.
- Control of exotic species within the development area.



Overview of Process/Schedule

The overall planning process is anticipated to extend over a period of approximately nine months. Project milestones include:

- Project Initiation: November 2002
- Data Collection and Studies: November 2002 – March 2003
- Public Scoping Meeting January 22, 2003
- Draft DCP/EA available for public review: April/May 2003
- Public Comment Meeting: May/June 2003
- DCP/EA Completed: August/September 2003

We want your comments!

Anyone interested in this planning effort is encouraged to visit the project web page at <http://www.nps.gov/glca/plan.htm>. The web page contains information on current project activities and links to project comment forms. Your comments can be emailed to GLCA_WWDCP_EA@nps.gov or you may send your written comments to:

National Park Service
Glen Canyon National Recreation Area
ATTN: WW DCP/EA
P.O. Box 1507
Page, Arizona 86040

If you would like to have your name removed from our mailing list, let us know by either the email address or P.O. Box shown above.

National Park Service
U.S. Department of the Interior



Glen Canyon National Recreation Area Newsletter 2

Project Update

February/March 2003

Wahweap Development Concept Plan (DCP) and Environmental Analysis (EA)

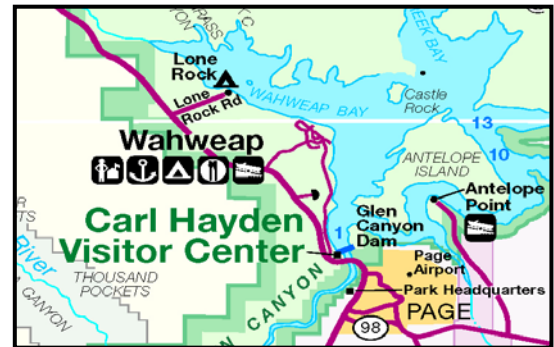
I. Background

In November of 2002, the National Park Service initiated work on a Development Concept Plan (DCP) and Environmental Assessment (EA) for the Wahweap Marina Area. Although the last DCP for this area was prepared fairly recently (1998), an update is needed. The need for an update stems from several factors, including the fact that changes in legislation and unforeseen economic conditions have had a significant impact on operations of the area.

One of the plan elements that has been affected by these changes is employee housing. The DCP update will address this important issue, including a determination of the amount of housing required to meet current and future needs as well as a decision on where additional housing should be located.

Even though an update is underway, it should be noted that many elements included in the 1998 DCP have been implemented or are currently underway. These include major upgrades and enhancements to the campground, relocation of visitor RV sites away from the housing area, expansion of parking in the launch ramp area, rehabilitation of the sewage lagoon, and development of a new store.

The new DCP is intended to guide future development of services, facilities and infrastructure for the next 15+ years. To direct planning efforts, a number of preliminary issues were identified including:



II. Scoping Meetings

A public scoping meeting was held on January 22nd, 2003 at Glen Canyon NRA at the Wahweap Lodge. The public was notified of the meeting using flyers, newspaper and radio ads and a newsletter that was mailed to over 200 people. The purpose of the meeting was to describe the project, the existing conditions and gather information. The attendees at the public meeting were asked to visit five stations to learn more information about key subjects and provide their input to National Park Service representatives and the consulting team.



Exhibits and topics presented at the meeting stations included:

- Meeting sign-in / Mailing list sign-up

- Park and project orientation
- Existing site conditions and highlights from the current Wahweap Development Concept Plan
- Visitation statistics and existing operations with defined carrying capacity summary
- Future goals and comment station

Attendees provided their input directly on the comment boards, to NPS representatives and consultants. Other comments were received from comment sheets left at the meeting or via the project website.

II. Key Issues

During the scoping meetings attendees participated in an issue identification exercise. Each person was asked to write down any issues or concerns they had relating to the project. If a comment was already on the presentation boards, they were asked to place a green dot adjacent to it if they thought it was important and a red dot if they did not. Participants also added clarifying statements under a comment to help explain why they thought it was important. Comments are listed below in a descending order of importance based on the number of green dots received. The number of green dots received can be found in the brackets adjacent to the comment.

- The amount of concession employee housing to be built on site. (17)

Supplemental comments

- Government housing competes with private enterprise.
- Remove trailers off the ridge edge.
- Group quarters would be great.
- Only way to work here is to have housing on-site.
- Need for transportation to areas outside the NRA
- Get rid of all trailers.
- Redo housing as apartments.
- Create better, cohesive units.



- Removal or adaptive reuse of Lake Powell Motel (on U.S. Highway 89).(13)

Supplemental comments:

- Change to employee housing, extended stay units, a day care or learning center. May need a new full-time employee for security of the area if use changes.
- How would you transport people from the hotel to other areas inside the NRA?

- Add a medical clinic to the NRA.(13)
- Add facilities to support operations in low water conditions. (12)
- Add additional facilities at the marina, including a restaurant. (11)

Supplemental comments:

- Provide more facilities (café) at State Line and Coves.
- Cater to the customer.

- Separate staging area for commercial boat operations.(11)
- Location of the dry boat storage operation. (9)
- Affordable housing should be provided. (6)
- A separate launching area for non-motorized vessels should be created. (5)

Supplemental comments:

- Create a separate launching area for personal watercraft



- A single concessioner has a monopoly over commercial enterprise at Wahweap. More free enterprise should be created. (5)
- Additional screening (visual) for NPS bone yard should be developed.(5)
- Control of exotic species within the development area should be emphasized. (3)
- Employee housing should not be allowed on the NRA. (3)
- A separate area for time-share boats should be created. (3)
- Off-road parking should be reduced. (3)
- A new visitor contact station should be developed. (1)
- Dedicated shuttle for off-site employees should be created. (1)
- The commercial laundry facility should be removed from the NRA. (0)

Additional written comments submitted by comment form or e-mail:

-If the overall boat carrying capacity at Wahweap were increased, what additional measures would be implemented to protect water quality?

-No concessioner should get a free ride on NPS land.

-Concessioner is a private business and should not be subsidized by tax payer dollars.

-A sole concessioner is a monopoly which violates anti-trust laws. The visitor will have a better experience at a more affordable price through competition and free enterprise.

-Launch ramp capacities must take into consideration the ever-growing number of in & out boats. One 60' houseboat must displace 25 power-boat launches.

-Restrict hours of launch for houseboats.

-Limit and enforce load times on courtesy docks.

-Docks or beach areas specific to houseboat loading for in/out boats.

-Foot path near RV (Lakeshore Dr.) heads toward the beach causing people to walk on the road to get to the lodge & campground. This is more "line of sight" to their destination.

-Parking for employees behind the boat repair building & more parking at Stateline ramp.

-Campground plans look great – nice facility.

-Add a concessioner launch ramp in cove behind the boat repair office to reduce public ramp traffic and lessen road wear.

-Employee housing should not be allowed in the park. It gives the concessioner an advantage over private industry.



IV. Overview of Process/Schedule

The planning process is scheduled to continue over the next several months. Project milestones include:

- Project Initiation: November 2002 (Done)
- Data Collection and Studies: November 2002 – March 2003 (Underway)
- Public Scoping Meeting January 22, 2003 (Done)
- Draft DCP/EA available for public review: April/May 2003
- Public Comment Meeting: May/June 2003
- DCP/EA Completed: August/September 2003

We want your comments!

Anyone interested in this planning effort is encouraged to visit the project webpage at <http://www.nps.gov/glca/plan.htm> that contains information on current project activities and links to project comment forms. Your comments can be emailed to GLCA_WWDCP_EA@nps.gov or you may send your written comments to:

National Park Service
Glen Canyon National Recreation Area
ATTN: WW DCP/EA
P.O. Box 1507
Page, Arizona 86040

National Park Service
U.S. Department of the Interior
**Glen Canyon National Recreation Area
Newsletter 3**



Project Update

May 2003

Wahweap Development Concept Plan (DCP) and Environmental Assessment (EA)

In November of 2002, the National Park Service (NPS) initiated work on a Development Concept Plan (DCP) and Environmental Assessment (EA) for the Wahweap District at Glen Canyon National Recreation Area. Although the last DCP for this area was prepared fairly recently (1998), an update is needed due to changes in NPS housing policies, new concession legislation and unforeseen economic conditions that may have a significant impact on the scale of operations envisioned for the area. One of the plan elements that may be affected by these changes is employee housing. The DCP update will address this issue by evaluating the location and volume of employee housing appropriate to support visitor operations. Other issues include the location and scale of development necessary to support launch ramp activities, parking and circulation, visitor service facilities, and low-water infrastructure. The new DCP is intended to guide future development for the next 15+ years.

Public Involvement

To better understand issues that affect the study area, a number of public outreach activities have occurred as part of the planning process. A scoping meeting was held at Wahweap on January 22, 2003 to gather early feedback and public input on plan issues to be considered in the DCP. A project website has been established and has updates posted regularly. A mailing list with over 1500 names, including dry boat storage and marina customers has also received direct mailings with project updates. A public meeting is scheduled in mid-May to obtain feedback on the range of DCP alternatives considered for the draft planning document. The draft DCP and EA are scheduled for publication and will be available for public comment in June 2003.



During the scoping meeting in January, information was presented on existing conditions and attendees participated in vision, goals and issue exercises. Approximately 50 people attended the scoping meeting.



PUBLIC OPEN HOUSE

You are invited to attend an open house on the Wahweap DCP alternatives. The gathering will be held on:

May 14, 2003, 5:30 pm - 7:30 pm (MST)
Wahweap Lodge, Navajo Room
Wahweap Marina (near Page, Arizona)
Glen Canyon National Recreation Area

The public is welcome to attend at any time during the two-hour session. No formal presentations are scheduled. Instead, the open house will have a collection of presentation stations intended to promote informal interaction and discussion with project experts and provide the public an opportunity to make written and verbal comments.

Plan Issues

The planning process and public comments have identified the following issues:

- Amount of concession employee housing to be built on site
- Removal or adaptive reuse of Lake Powell Motel (on US Hwy 89)
- Location of the dry boat storage operation
- Separate launching area for non-motorized vessels
- Additional food service facilities at the marina and/or Stateline launch ramp
- Separate docks for houseboat staging
- Facilities to support operations in low water conditions.
- Removal of commercial laundry from within the park.

DCP Alternatives under Consideration

Three alternatives have been developed based on feedback obtained during public and NPS scoping. One element of the plan concerns the future number of concession employees to be housed within the Wahweap district. Several issues were considered when developing the range of alternatives for this element:

- Housing Needs Assessment for Glen Canyon NRA (1999) as a guideline for housing development within the park.
- A current housing market analysis for Page, Greene Haven, and Big Water communities.
- The number of concession employees critical to meet visitor service objectives and provide first response duties during emergencies.

The abbreviated table below summarizes the range of alternatives under consideration for the draft DCP. Further descriptions will be included in draft DCP and EA document available in June.

We want your comments!

Anyone interested in this planning effort is encouraged to visit the project web page at <http://www.nps.gov/glca/plan.htm>.

Your comments can be emailed to GLCA_WWDCP_EA@nps.gov or you may send your written comments to:

**National Park Service
Glen Canyon National Recreation
Area**

ATTN: WW DCP/EA

P.O. Box 1507

Page, Arizona 86040

<u>ALTERNATIVE A - (NO ACTION)</u>	<u>ALTERNATIVE B</u>	<u>ALTERNATIVE C</u>
<ul style="list-style-type: none"> •Maintain existing concessioner housing numbers. Continue to implement the NPS trailer replacement goals. •Consult with AZ SHPO. Maintain trailer village cabins at current location and use as concession housing. Upgrade to meet code requirements. •Complete funded campground rehabilitation. •Maintain existing parking numbers •No visitor center within Wahweap. Maintain contact area at Ranger Station. •Complete construction of fire station. •Maintain fee stations •Maintain NPS maintenance area •Maintain current use at Lake Powell Motel (LPM) •Maintain current lodge room totals and renovate for code requirements. •Maintain service station •Maintain existing fish cleaning station •Maintain dry boat storage and construction area at current location. •Maintain commercial laundry facility. •Maintain NPS maintenance storage yard. •No new food service facilities •No recycling transfer station in park •Maintain launch ramp size but extend to low water •Maintain fuel docks and upgrade for safer fuel containment •Maintain slip/buoy numbers renovate for safety •Maintain current tour boat fleet / support docks 	<ul style="list-style-type: none"> •Provide 1st response concessioner housing only. •Consult with AZ SHPO. Record documentary evidence of trailer village cabins and eventually remove structures. •Continue campground improvements proposed in 1998 design master plan. •Parking area improved/expanded at Stateline. •New visitor contact station. •Maintain fire station once constructed •Maintain fee stations •Renovate NPS maintenance area. •Provide bike trail to Page •Relocate all visitor camping hook-up sites to rehabilitated campground. •Remove Lake Powell Motel and revegetate site. •Remodel lodge for meeting rooms and improve traffic circulation. •Remodel service station and modify services. •Maintain existing fish cleaning station •Screen dry boat storage and construction area at current location •Eliminate commercial laundry facility. •Screen NPS maintenance storage yard •No new food service facilities •No recycling transfer station in park •Maintain launch ramp size but extend to low water •Expand fuel docks at main ramp / upgrade all fuel docks for safer containment •Expand slips for short-term uses/renovate for safety / introduce shuttle system. •Reduce number of tour boats / expand staging area for customer access. 	<ul style="list-style-type: none"> •Provide 1st response and short-term concessioner seasonal housing •Consult with AZ SHPO. Vacate trailer village cabins and stabilize in current location or relocate to public use area. Record documentary evidence. •Continue campground improvements proposed in 1998 design master plan •Parking area improved/expanded at Stateline. •Expand contact area at Ranger Station •Maintain fire station once constructed. •Expand fee station facilities. •Renovate NPS maintenance area. •Provide bike trail to page •Relocate all visitor camping hook-up sites to rehabilitated campground. •Remove Lake Powell Motel and revegetate site. •Expand number of lodge rooms. Remodel for meeting rooms and improve traffic circulation. •Remodel and expand service station, modify services and include boat wash area •Renovate fish cleaning station and improve circulation. •Relocate dry boat storage and construction area and screen. •Eliminate commercial laundry facility. •Modify layout and screen NPS maintenance storage yard. •Develop additional food service facilities. •Develop recycling transfer station inside park. •Maintain launch ramp size but extend to low water and add courtesy docks and staging areas •Expand fuel docks at main ramp / upgrade all fuel docks for safer containment •Expand slips for short-term uses/renovate for safety / introduce shuttle system / Move 50% of existing marina to create marina facilities at Stateline •Reduce number of tour boats / expand staging area for customer access.

A.2 NATIVE AMERICAN CONSULTATION COMMENT SUMMARY

Inscription House Chapter:

February 16, 2003, at least 40 people attended the meeting.

- Fee collections, why do we get charged when we enter the Wahweap area? We should have a pass because we have always been here before development.
- Wahweap is expanding again; we need to request National Park Service's assistance in an archival search for all records of agreements and water wells that were to be established on the southern shorelines of the lake. We know negotiation and agreements between Navajo Nation and the government took place before construction of the dam. Water is getting low; some livestock cannot get access to water that is important to us.

LeChee Chapter:

February 17, 2003, 42 people attended meeting.

- No comments.

Gap/Bodaway Chapter:

February 18, 2003, approximately 45 people in attendance.

- We would like to see Antelope Point Development offer the same types of services as Wahweap Marina does.

Kaibeto Chapter:

February 23, 2003, 40 people attended.

- Wahweap is across the lake from Page; however, we always had interest in all of the natural resources the area impacts. When the area was first developed, we were never consulted.
- Fee Collection program, Native people should not be expected to charge the entrance fee into Wahweap.

Coppermine Chapter:

February 25, 2003, approximately 35 people attended.

- Did not receive any comments.

Navajo Mountain Chapter:

March 2, 2003, planning meeting had approximately 30 people.

Did not have comments on the Wahweap DCP, but had questions and concerns with the Bureau of Reclamation.

The other four tribes were also contacted for their input on the Wahweap DCP and EA.

Kaibab Paiute Tribe: February 20, 2003 at their tribal council meeting.

- What is the status on the personal water craft (PWC)? The PWC use on the lake is closed right now.
- The Antelope Point Marina, will it have a casino? No, the development concept plan (DCP) does not have any plan to include a casino. Further, the Navajo Nation voted twice not to have a casino on the Navajo Indian Reservation.
- What about since the Navajo Nation President Joe Shirley has been voted in? We have no knowledge of any casino development plans on or near Antelope Point Development thus far.
- What is the lake elevation? Currently, it is approximately 36----.
- We have read that Lake Powell water to be piped to St George, Utah. What is the status with that? I have no knowledge about the issue. I do not think there has been an official request as such. I'll follow up and get back with you on it.

- We appreciate all the information you have given us. We will contact and meet with our elders on the Wahweap DCP and write to the address you provided us. Please keep us informed on all the issues, especially the pipeline that will coming through our reservation if they go through with it.

Ute Mountain Ute: March 12, 2003 at their tribal council meeting.

- The lake elevation is getting very low, is the National Park Service going to close the launch ramps? No, some launch ramps are currently being extended while the water is low.
- Will the Antelope Point Development include a casino? No, casino has never been in the development plans.
- The White Mesa Ute Band of Ute Mountain Ute Tribe was recommended to work with Glen Canyon NRA. The contact people would be Mary Jane Yazzie and Gwen Cantsee at 435-678-3397.

San Juan Southern Paiute: April 18, 2003 meeting in Vice President Evelyn James' office.

- No comments offered, however, the reception was good.

Hopi Tribe: Meeting schedule was attempted for the months of March and April 2003, however, their administrative and advisory meetings are always too full for us to get on their agenda. Currently, we are working get on their agenda in May 2003.

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Appendix B – Concept Plans

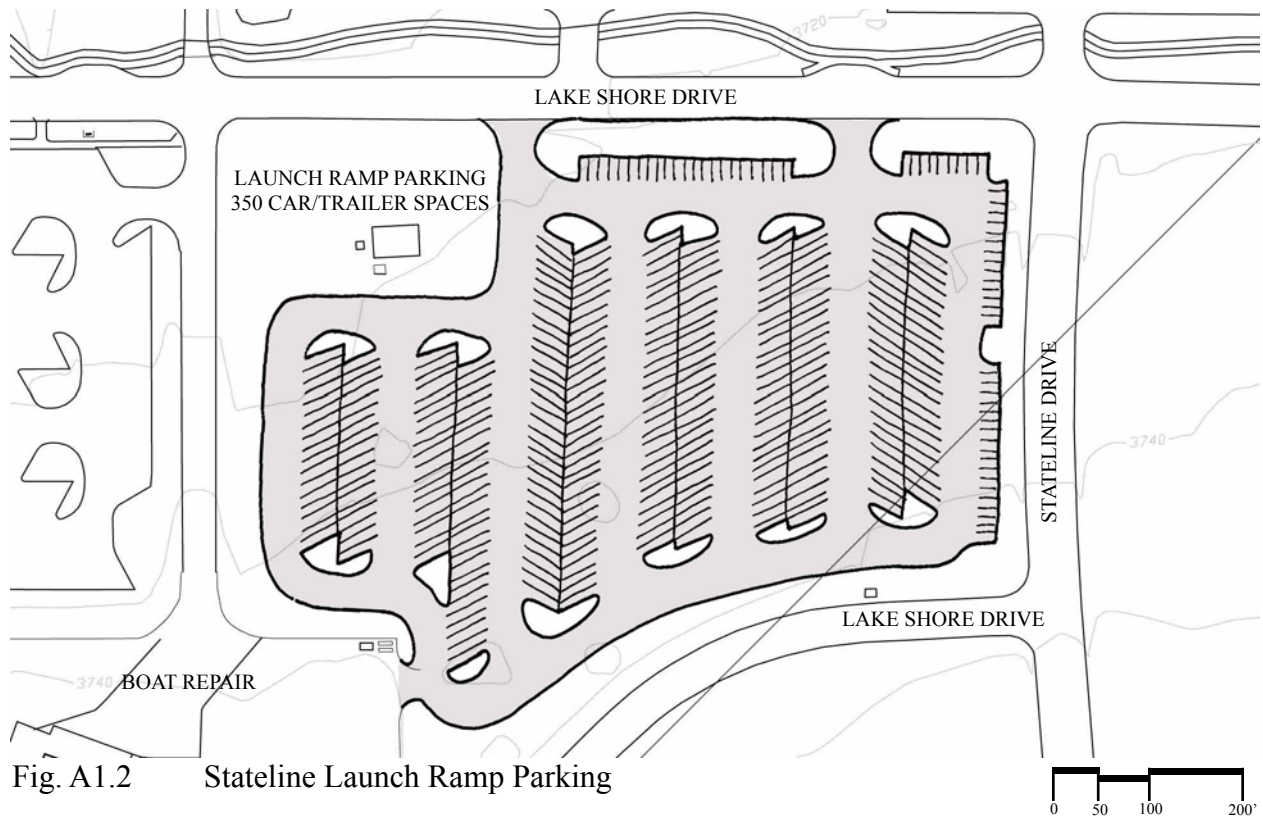
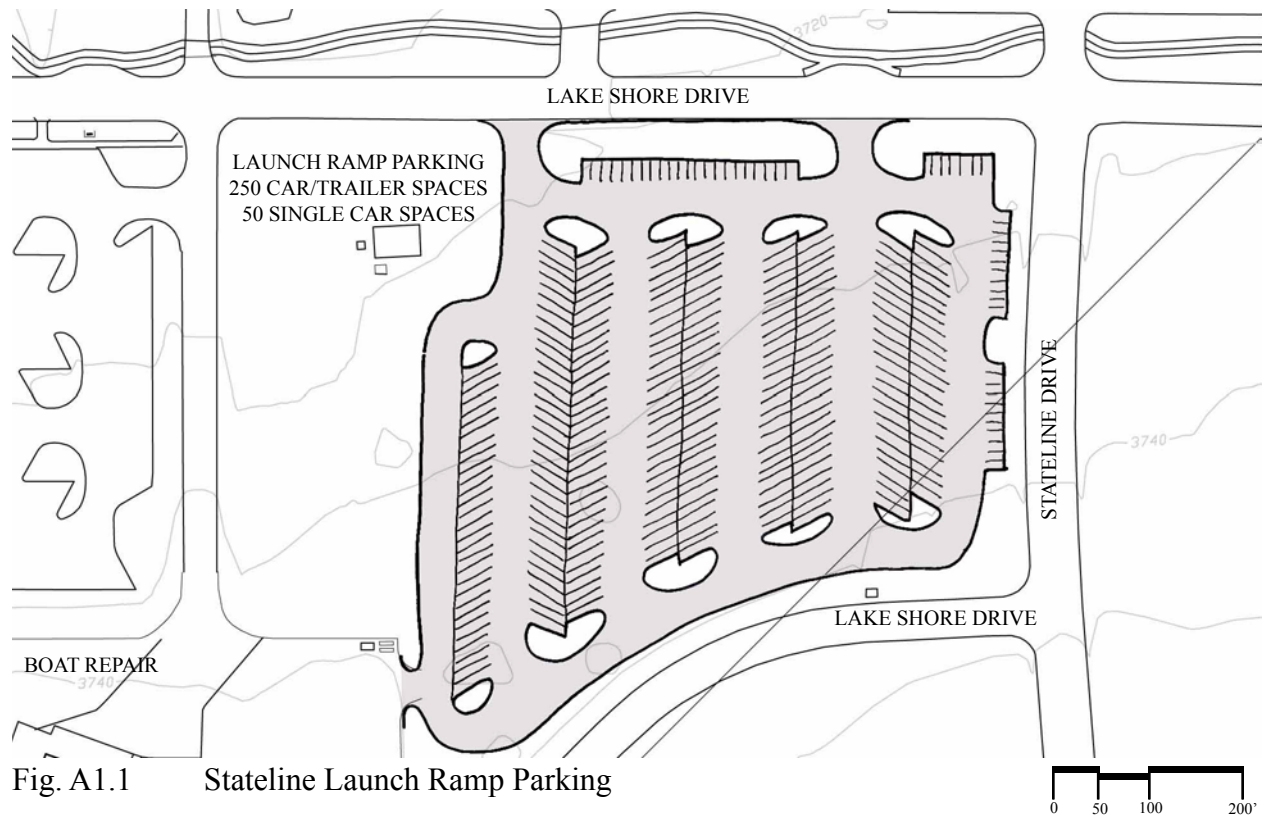
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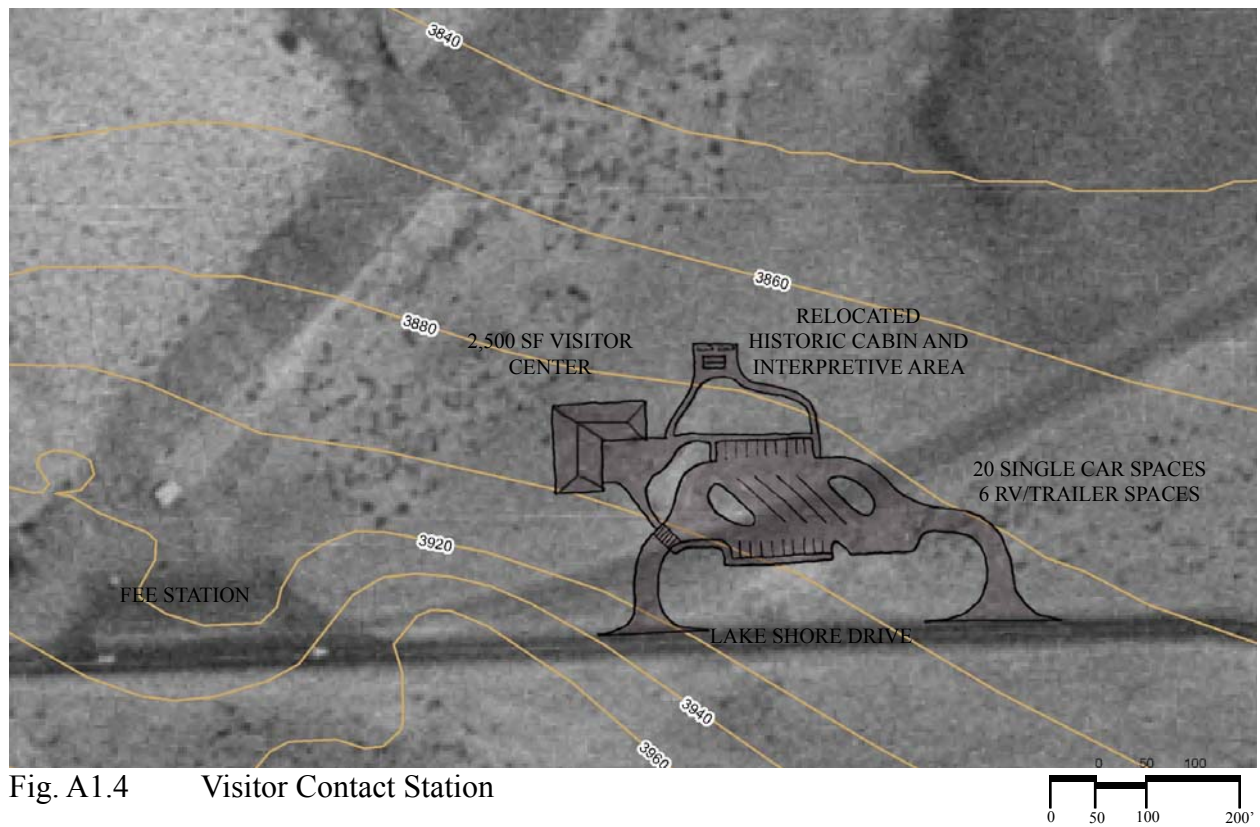
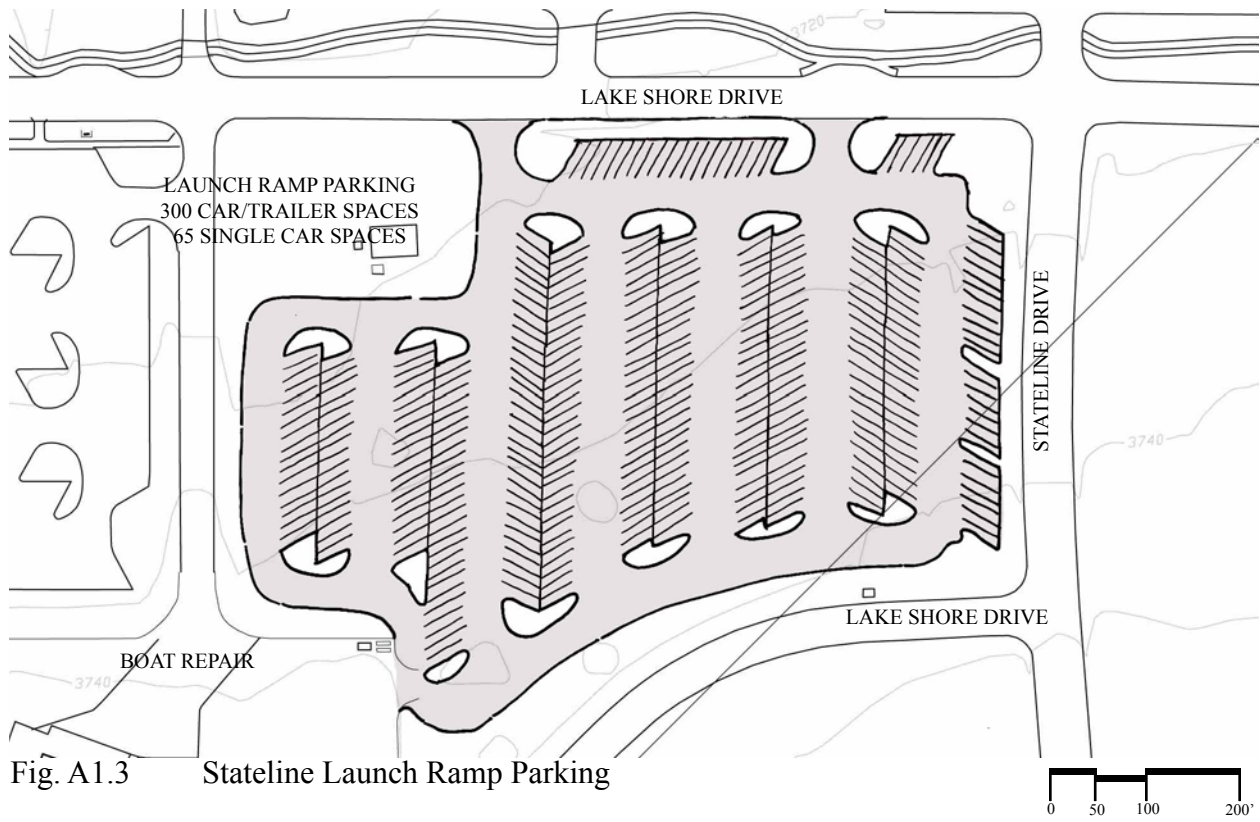
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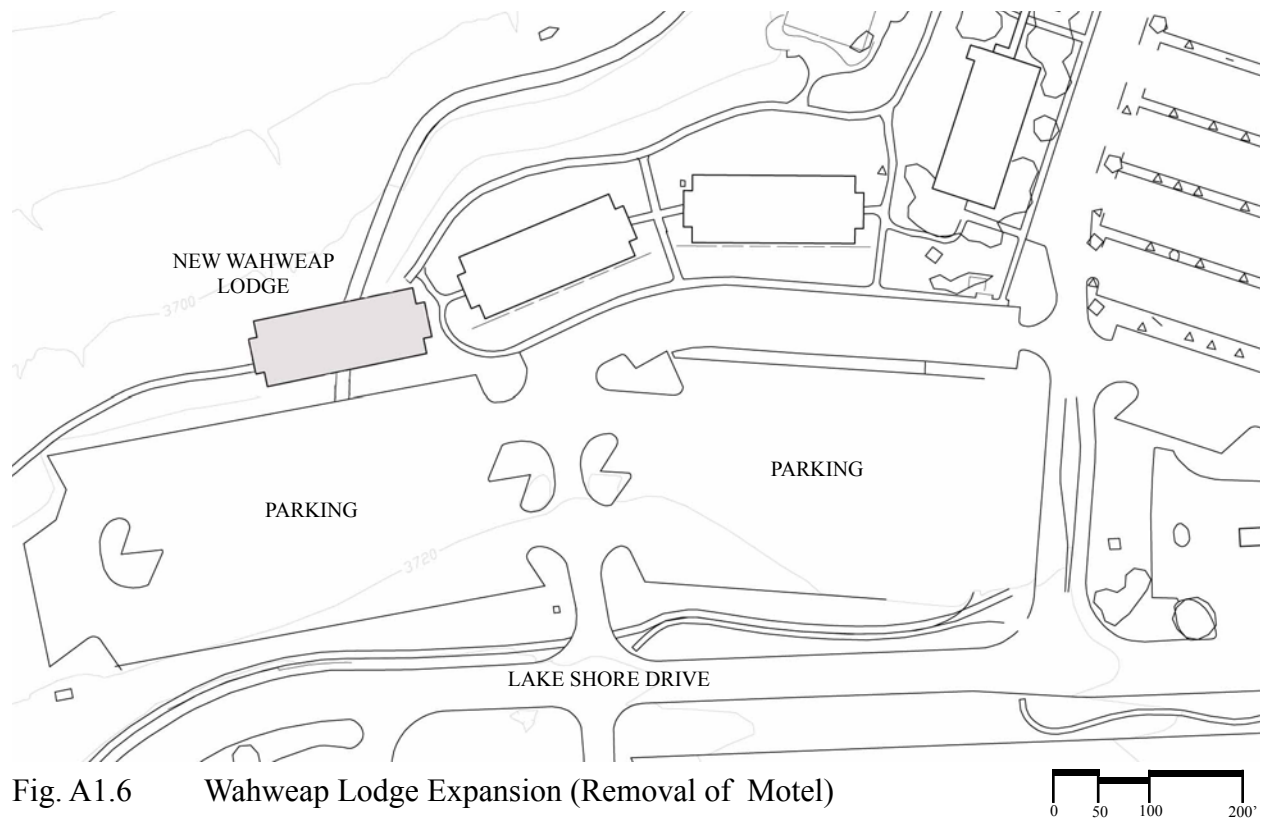
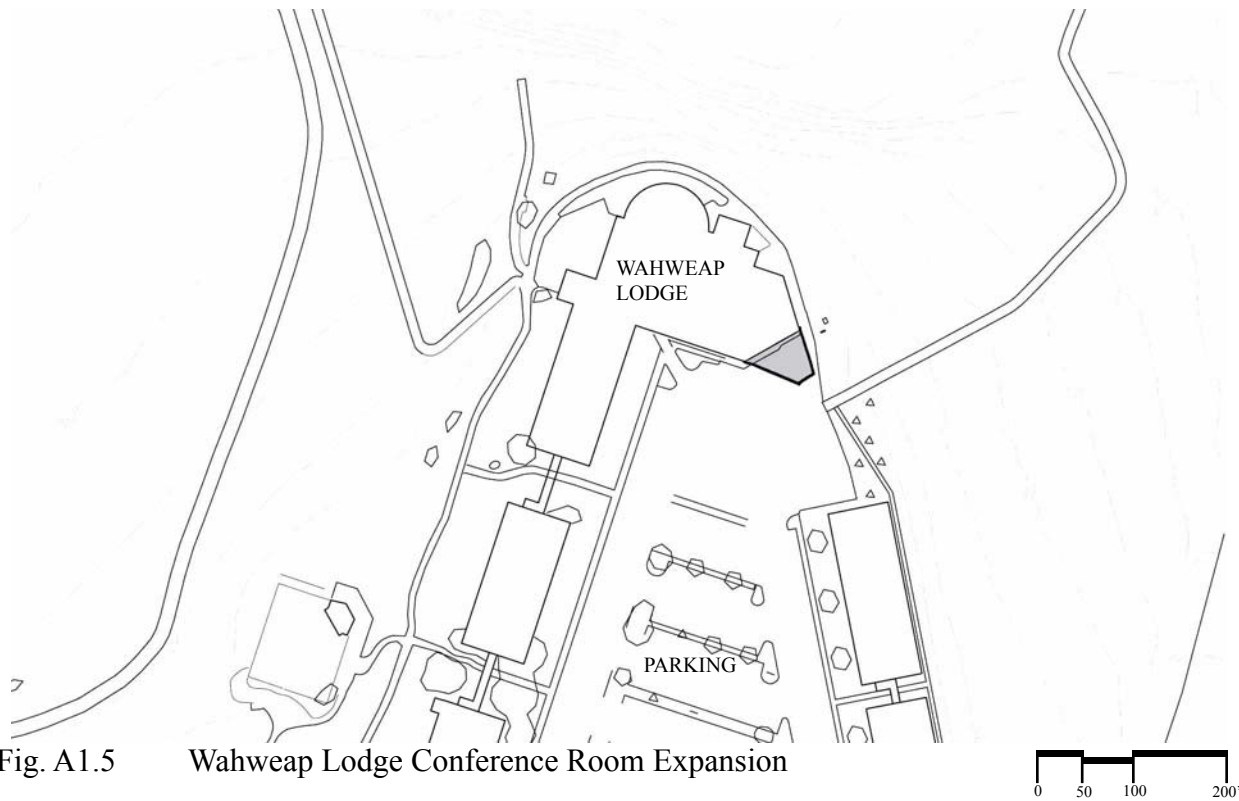
A number of concept plans were developed during the Wahweap DCP process to evaluate the feasibility of elements proposed under the three alternatives described in Chapter 2. Concept plans represent only potential development possibilities; the final scenarios will be determined through further design development.

Included are concept plans for the following:

- Launch Ramp Parking
- Visitor Contact Station
- Wahweap Lodge
- Dry Boat Storage
- Construction Area
- Food Service Facility
- Boat Ramp Area
- Concessioner Housing







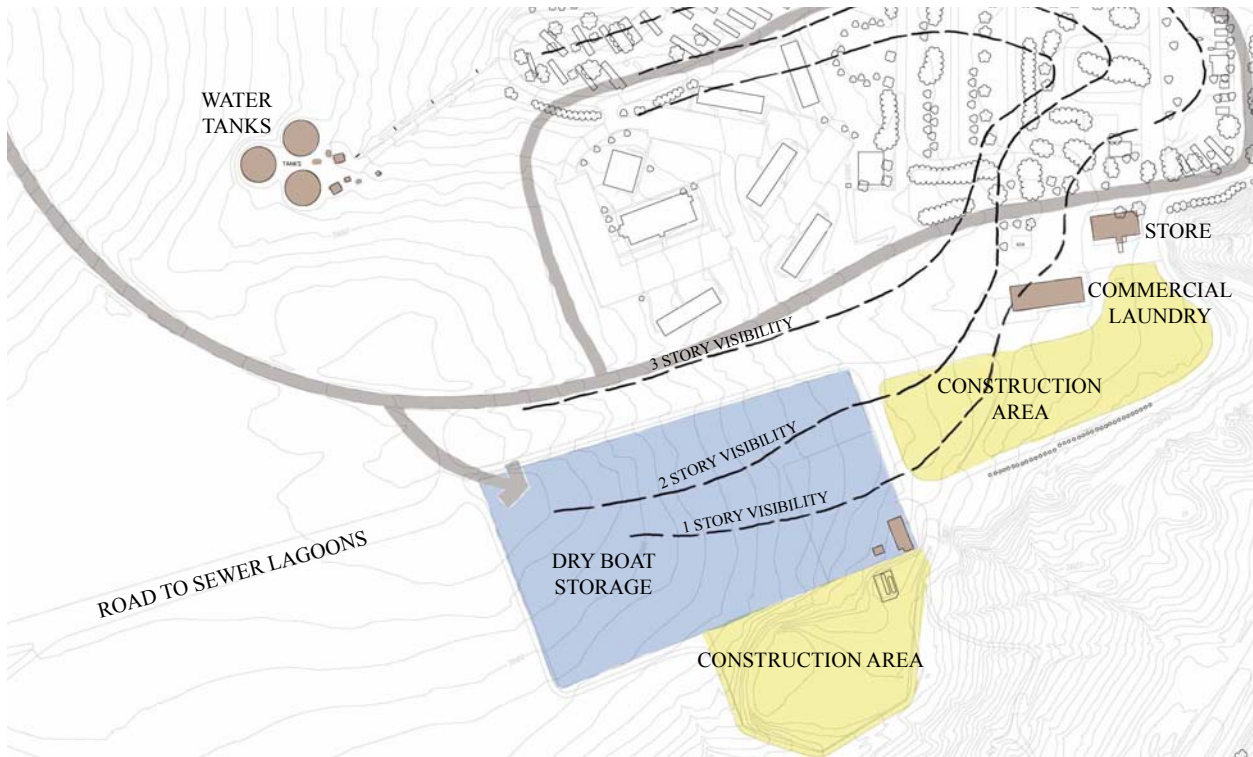


Fig. A1.7 Dry Boat Storage and Construction Area

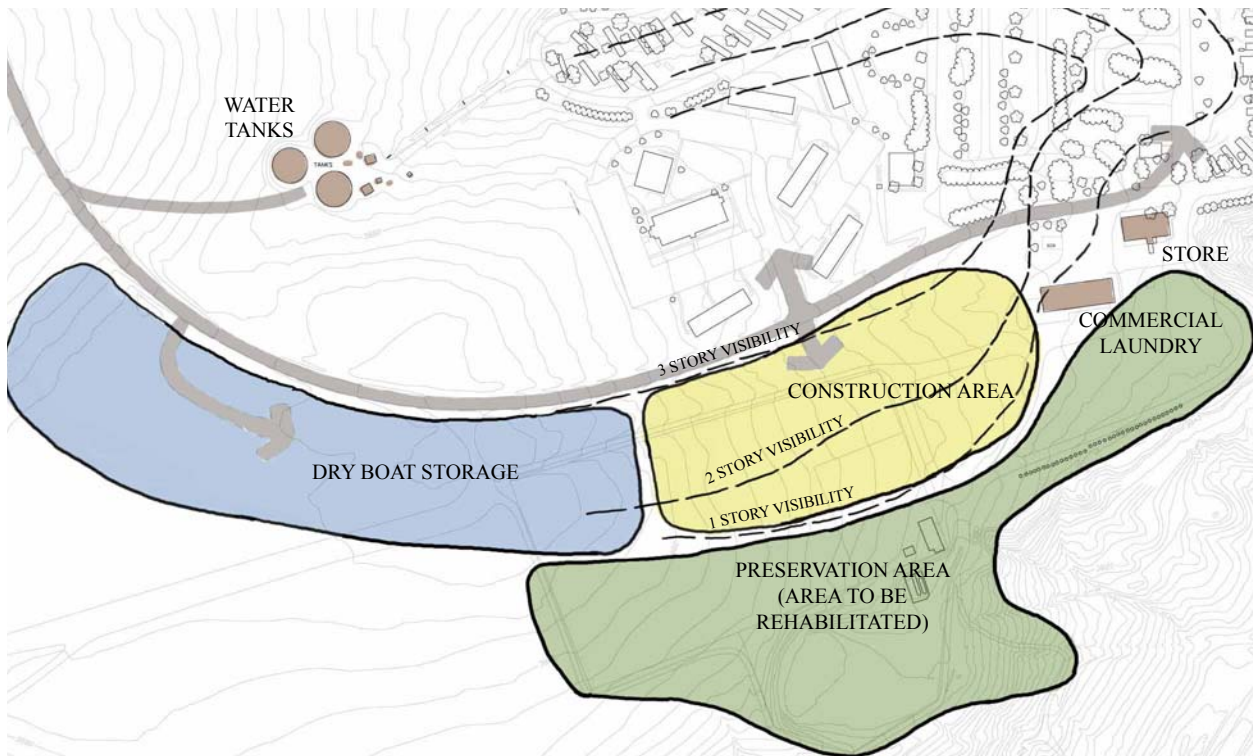


Fig. A1.8 Dry Boat Storage and Construction Area





Fig. A1.9 Dry Boat Storage

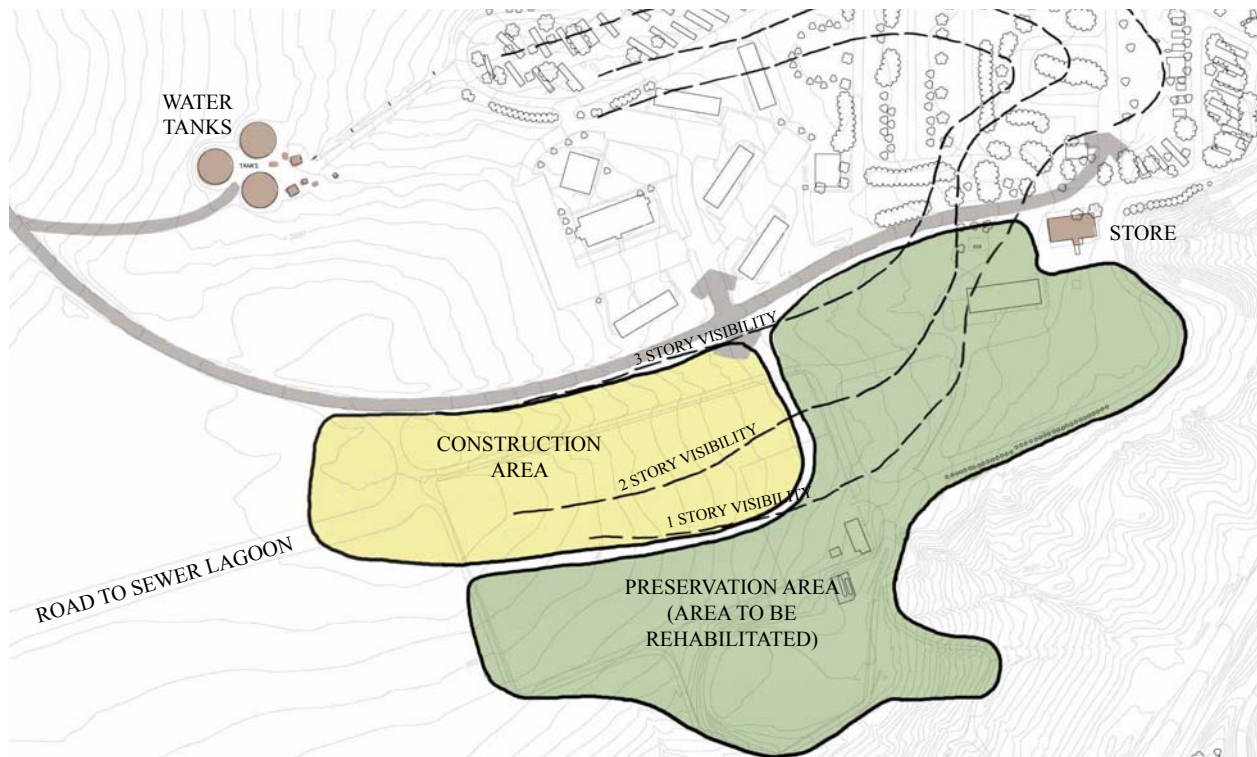


Fig. A1.10 Construction Area

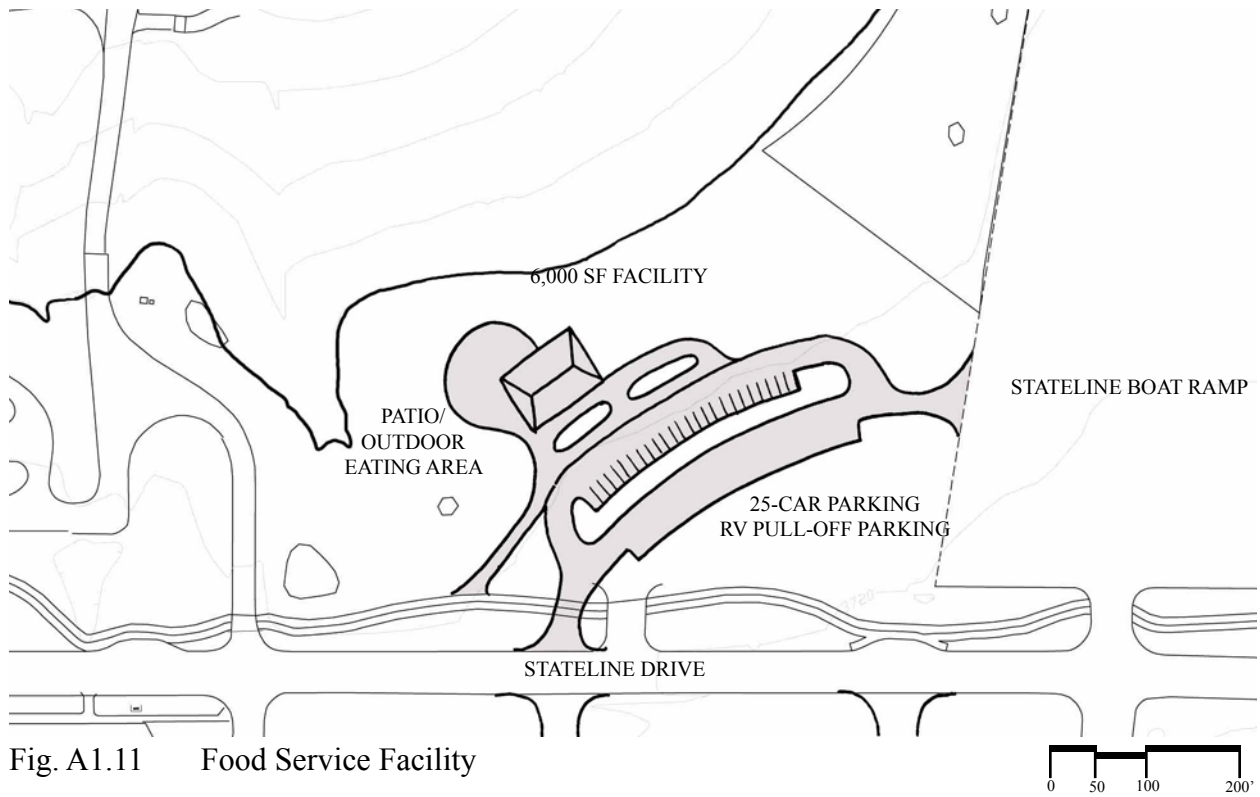


Fig. A1.11 Food Service Facility

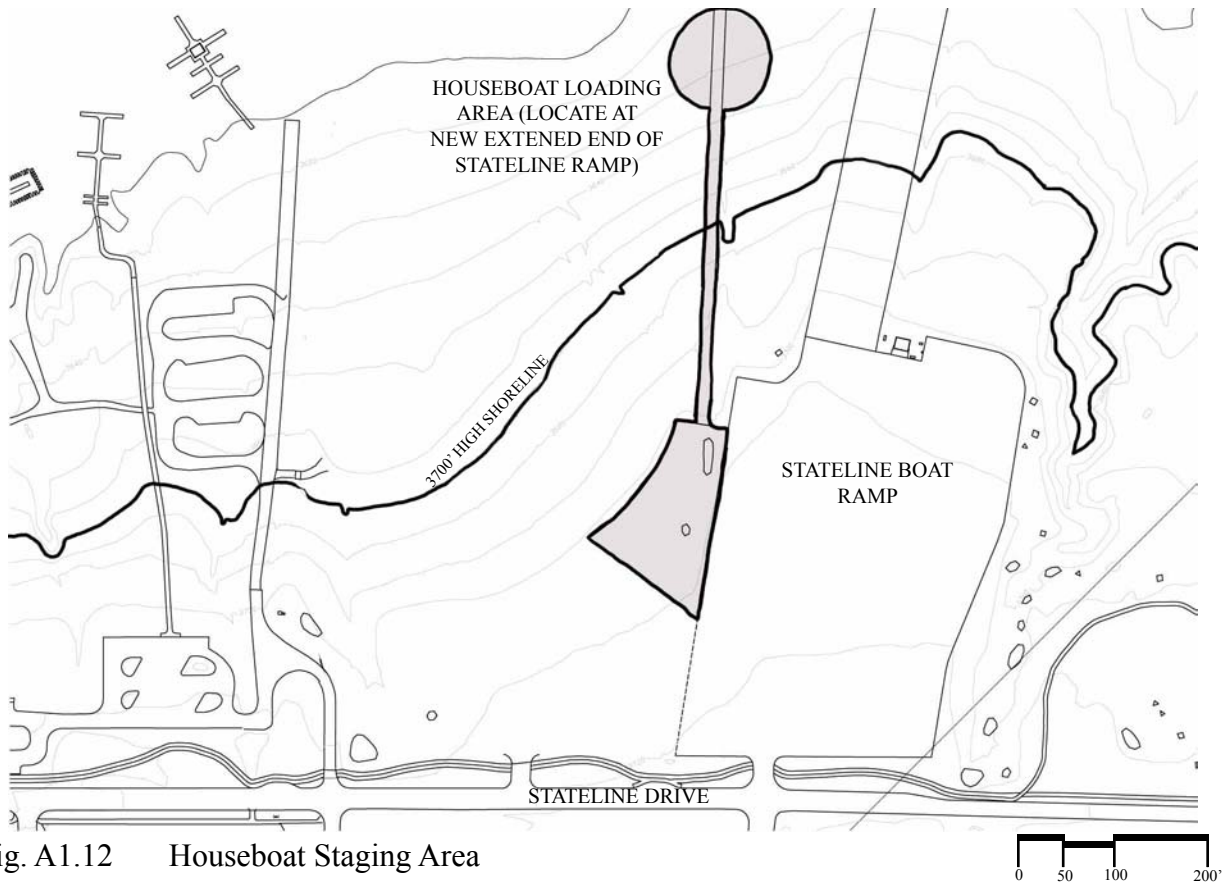
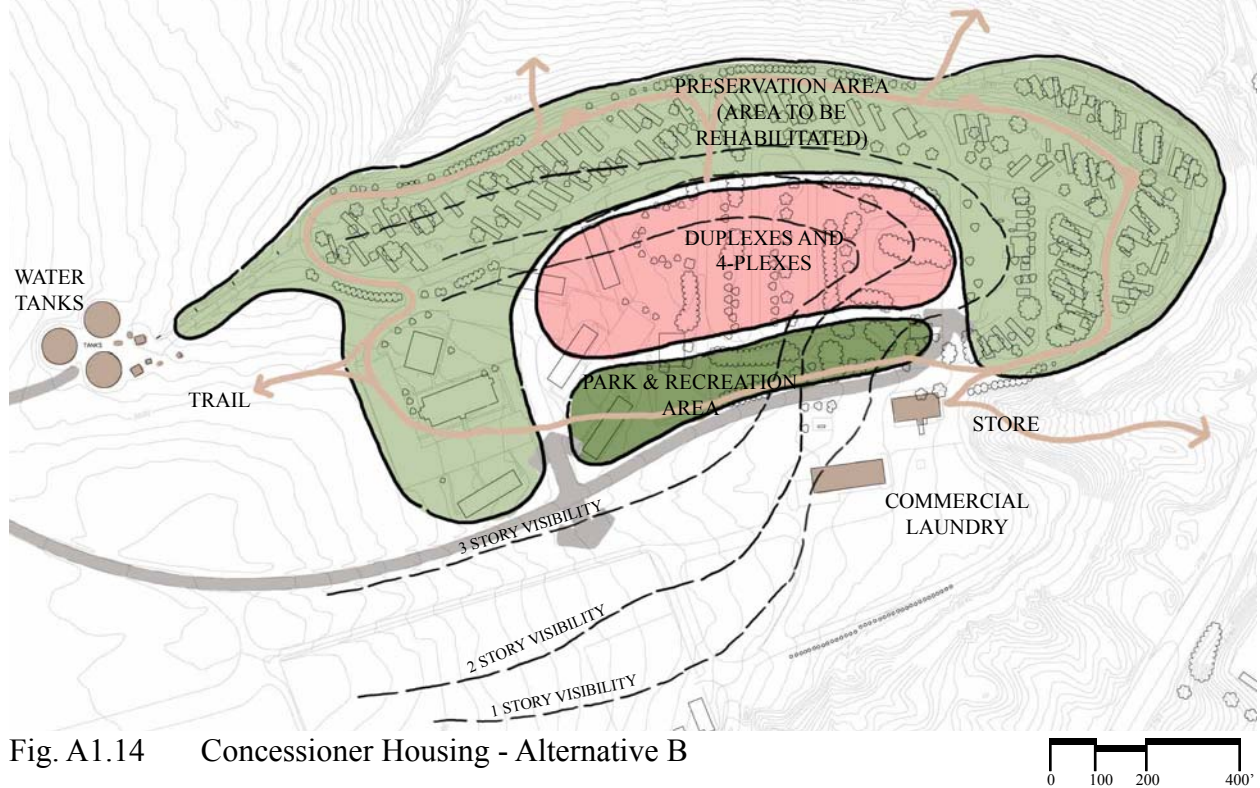
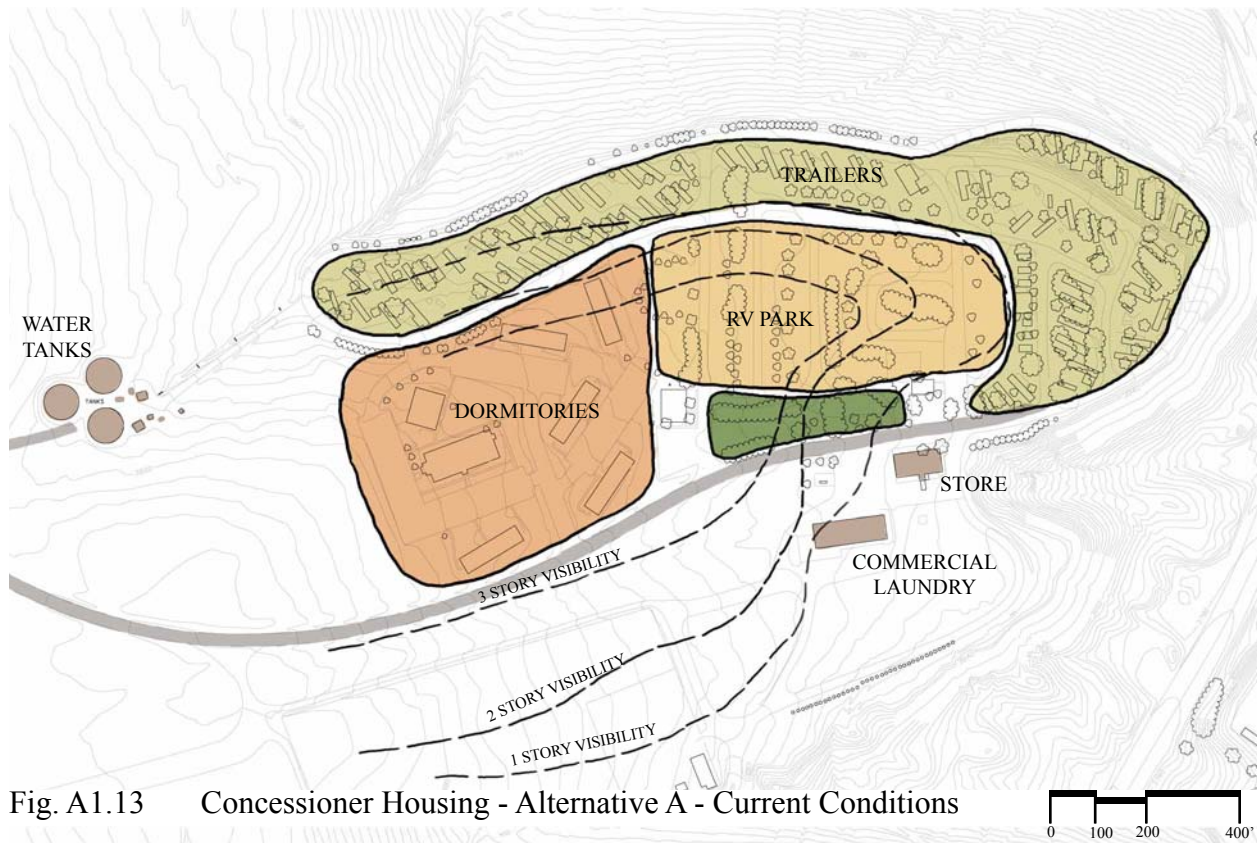


Fig. A1.12 Houseboat Staging Area



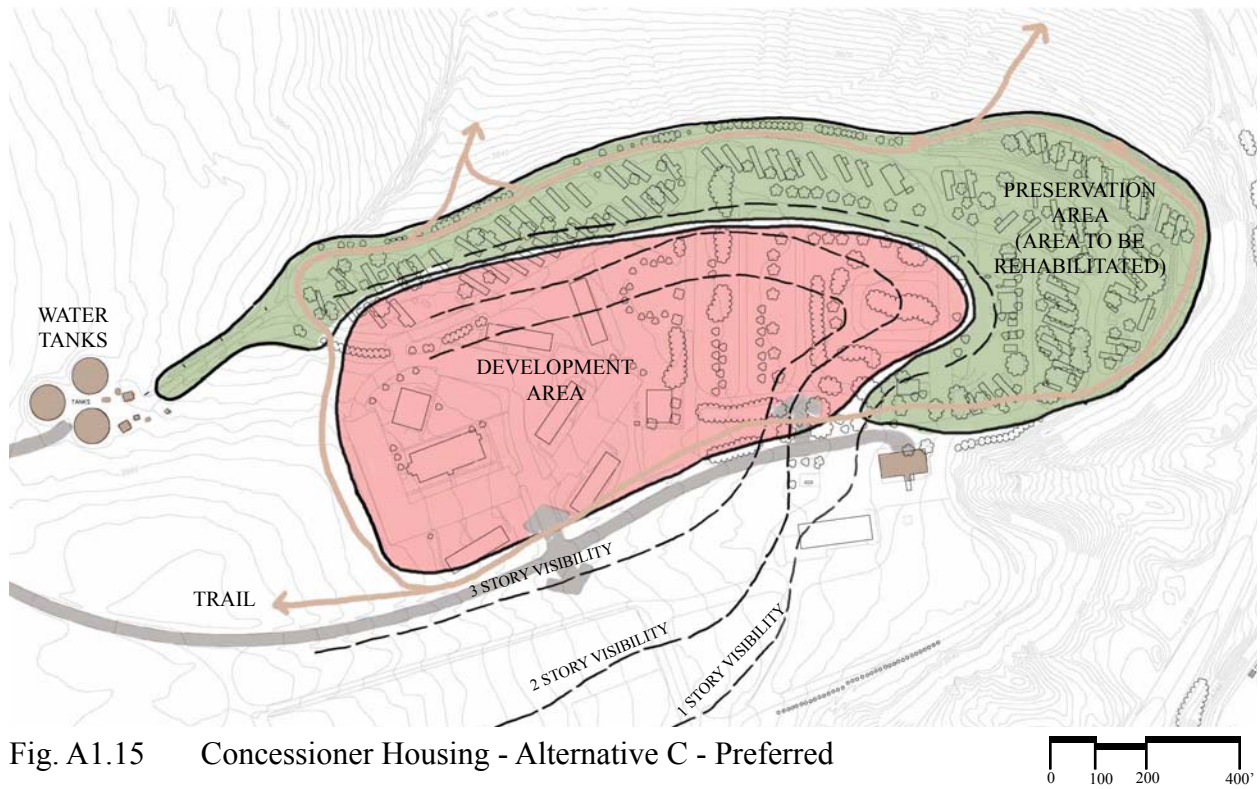


Fig. A1.15 Concessioner Housing - Alternative C - Preferred

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Appendix C – Costing Information

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WAHWEAP DEVELOPMENT CONCEPT PLAN/ENVIRONMENTAL ASSESSMENT ALTERNATIVES ORDER OF MAGNITUDE COST ESTIMATE						EDAW, Inc. July 10, 2003
NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
HOUSING						
1	Concessionaire Housing					
	Alternative A					
	No cost associated with Alternative A					
	Alternative B					
	Site Development - Demolition	LS	TOTAL \$400,000	1	\$3,765,000 \$400,000	Includes the demolition/removal of mobile homes, trailers, RV sites and dormitories from concessionaire housing area. This includes the cost for clearing and grubbing the site to enable site rehabilitation.
	Site Development - New Housing - First Response Housing	LS	\$3,200,000	1	\$3,200,000	Housing types include twelve (12) three bedroom multiplex units w/parking area and enclosed yard, (with double occupancy), six (6) two bedroom multiplex units w/parking lot, and enclosed yard, (single occupancy). Housing is for up to 30 first response employees. Average density is 4.5 units per acre.
	Site Rehabilitation	LS	\$165,000	1	\$165,000	Native Landscape restoration. Includes earthworks, mounding, hydroseeding, planting, and associated costs to rehabilitate site.
	Alternative C					
	Site Development - Demolition	LS	TOTAL \$400,000	1	\$9,685,000 \$400,000	Includes the demolition/removal of mobile homes, and trailers from concessionaire housing area. Remove and replace existing dormitories over time.
	Site Development - New Housing - First Response Employees	LS	\$3,200,000	1	\$3,200,000	Housing types include twelve (12) three bedroom multiplex units w/parking area and enclosed yard, (with double occupancy), six (6) two bedroom multiplex units w/parking lot, and enclosed yard, (single occupancy). Housing is for up to 30 first response employees. Average density is 4.5 units per acre.
	Site Development - New Housing - Seasonal Employees	LS	\$4,660,000	1	\$4,660,000	Assumptions are 113 employees are in double occupancy dorm style rooms with full bathrooms (56 rooms), 14 employees in single occupancy dorm style rooms with full bathrooms (14 rooms), studio rooms (4-14 rooms), and 20 RV sites with phone, electric, water, sewer and satellite hookup. Seasonal housing is for 175 Seasonal Employees.
	Site Development - New Housing - Seasonal Housing Support Facilities	LS	\$1,300,000	1	\$1,300,000	Includes 100 seat cafeteria, weight room/rec area, employee laundry, rehabilitation of existing shower building and store.
	Site Rehabilitation	LS	\$125,000	1	\$125,000	Includes earth, mounding, hydroseeding, planting, and associated costs to rehabilitate site.

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Wahweap Development Concept Plan
Environmental Assessment

NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
2	Cabins					
	Alternative A		TOTAL		\$350,000	
	Site Development - Modify Interior in accordance to housing code.	SF	\$100	3500	\$350,000	Allows for modifications of each interior to ensure they meet housing codes.
	Alternative B		TOTAL		\$111,000	
	Site Development - Demolition	EA	\$5,000	7	\$35,000	Demolition and removal of each cabin.
	Site Development - Clear and Grub Site	AC	\$1,000	1	\$1,000	Removal of ground material to enable rehabilitation or rebuilding on site
	Interpretative Feature - Wayside Exhibit in lodge area	LS	\$75,000	1	\$75,000	Includes wayside exhibit facilities.
	Alternative C		TOTAL		\$75,000	
	Site Preservation - Cabin Interior Demolition	EA	\$10,000	7	\$70,000	Includes cabin stabilization for preservation.
	Security Fencing	LF	\$10	500	\$5,000	Chain mesh security fencing.
	LAND FACILITIES/ACTIONS					
3	Campgrounds					
	Alternative A					
	No cost associated with Alternative A					
	Alternative B		Total		\$8,300,000	
	Site Development - Redevelop Remaining Campground Loops as per 1998 Master Plan	LS	\$8,300,000	1	\$8,300,000	Cost based on the remaining 1998 Master Plan elements consisting of the redevelopment of Loop E, G, H and I and the development of Loop D, Walk-in Tent Sites and the final stage of the Group Sites.
	Alternative C		Total		\$8,300,000	
	Site Development - Redevelop Remaining Campground Loops as per 1998 Master Plan	LS	\$8,300,000	1	\$8,300,000	Cost based on the remaining 1998 Master Plan elements consisting of the redevelopment of Loop E, G, H and I and the development of Loop D, Walk-in Tent Sites and the final stage of the Group Sites.
4	Launch Ramp Parking					
	Alternative A		Total		\$0	
	No cost associated with this alternative			1	\$0	

NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
	Alternative B		Total		\$1,190,000	
	Site Development - Site Preparation	LS	\$210,000	1	\$210,000	Cost includes all earthworks to construct a 365 car/trailer parking area at Stateline Boat Launch. 24000 CY assumed.
	Site Development - Site construction	LS	\$630,000	1	\$630,000	Includes costs to construct a 365 car/trailer parking area at Stateline Boat Launch. Lump sum figures 320,000 S.F. of asphalt, concrete curbing, accessible parking spaces, pavement markings, and signage.
	Site Development - Site utilities	LS	\$260,000	1	\$260,000	Includes costs for potable water, fire hydrants, storm water system, detention basin, electrical distribution and lighting for the parking lot and associated paths.
	Site Development - Native Landscape enhancements	LS	\$90,000	1	\$90,000	Includes costs for native planting including trees, grasses and shrubs, boulders, and irrigation.
	Alternative C		Total		\$1,190,000	
	Site Development - Site Preparation	LS	\$210,000	1	\$210,000	Cost includes all earthworks to construct a 365 car/trailer parking area at Stateline Boat Launch. 24000 CY assumed.
	Site Development - Site construction	LS	\$630,000	1	\$630,000	Includes costs to construct a 365 car/trailer parking area at Stateline Boat Launch. Lump sum figures 320,000 S.F. of asphalt, concrete curbing, accessible parking spaces, pavement markings, and signage.
	Site Development - Site utilities	LS	\$260,000	1	\$260,000	Includes costs for potable water, fire hydrants, storm water system, detention basin, electrical distribution and lighting for the parking lot and associated paths.
	Site Development - Native Landscape enhancements	LS	\$90,000	1	\$90,000	Includes costs for native planting including trees, grasses and shrubs, boulders, and irrigation.
5	Visitor Contact Station					
	Alternative A		Total		\$0	
	No cost associated with this alternative			1	\$0	
	Alternative B		Total		\$615,000	
	Site Development - Site Preparation	LS	\$24,000	1	\$24,000	Cost includes all earthworks and site preparation for Visitor Contact Station and parking area. 3000 CY assumed.
	Site Development - Site construction	LS	\$96,000	1	\$96,000	Includes costs to construct a parking lot for 20 cars and six RV's, associated signage, curb and guttering, and concrete plaza and trails.
	Site Development - Building	LS	\$325,000	1	\$325,000	Assumes a 2500 S.F. building at \$130 S.F.
	Site Development - Site utilities	LS	\$120,000	1	\$120,000	Includes costs for potable water, fire hydrants, storm water system, detention basin, electrical distribution and lighting for the parking lot and associated paths, and plaza space.
	Site Development - Native Landscape enhancements	LS	\$50,000	1	\$50,000	Includes costs for native planting including trees, grasses and shrubs, boulders, and irrigation.

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NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
	Alternative C		Total		\$266,000	
	Site Development - Site Preparation	LS	\$24,000	1	\$24,000	Cost includes all earthworks and site preparation for Ranger Station expansion for Visitor Contact Station and expanded parking area. 3000 CY assumed.
	Site Development - Site construction	LS	\$70,000	1	\$70,000	Includes costs to expand existing parking area for new demand of visitors, associated signage, curb and guttering, and connecting concrete trails.
	Site Development - Building	LS	\$130,000	1	\$130,000	Assumes a 1000 S.F. expansion to existing building at \$130 S.F.
	Site Development - Site utilities	LS	\$7,000	1	\$7,000	Includes costs for new lighting for expanded parking area.
	Site Development - Native Landscape enhancements	LS	\$35,000	1	\$35,000	Includes costs for native planting including trees, grasses and shrubs, boulders, and irrigation.
6	Fee Stations					
	Alternative A		Total		\$0	
	No cost associated with this alternative			1	\$0	
	Alternative B		Total		\$0	
	No cost associated with this alternative			1	\$0	
	Alternative C		Total		\$638,000	
	North Entry					
	Site Development - Site construction	LS	\$24,000	1	\$24,000	Cost includes new asphalt for lane modifications for new fee station, and staff parking area.
	Site Development - New Fee Station Kiosk	LS	\$93,000	1	\$93,000	Cost includes the construction and installation of 1 new fee station kiosk for North Entry, and shade structure.
	Site Development - Staff Building	LS	\$65,000	1	\$65,000	Assumes a 500 S.F. staff break room, with restroom and storage space at \$130 S.F.
	Site Development - Site utilities	LS	\$75,000	1	\$75,000	Includes costs for electrical distribution and lighting for Fee Stations, Staff Parking, and Staff Building.
	Site Development - Native Landscape enhancements	LS	\$10,000	1	\$10,000	Includes costs for native planting including trees, grasses and shrubs, boulders, and irrigation.
			Subtotal		\$267,000	
	South Entry					
	Site Development - Site construction	LS	\$35,000	1	\$35,000	Cost includes new asphalt for lane modifications for new fee stations, and staff parking area.
	Site Development - New Fee Station Kiosk	LS	\$93,000	2	\$186,000	Cost includes the construction and installation of two new fee station kiosks for South Entry, and shade structures.
	Site Development - Staff Building	LS	\$65,000	1	\$65,000	Assumes a 500 S.F. staff break room, with restroom and storage space at \$130 S.F.
	Site Development - Site utilities	LS	\$75,000	1	\$75,000	Includes costs for electrical distribution and lighting for Fee Stations, Staff Parking, and Staff Building.
	Site Development - Native Landscape enhancements	LS	\$10,000	1	\$10,000	Includes costs for native planting including trees, grasses and shrubs, boulders, and irrigation.
			Subtotal		\$371,000	

NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
7	Fire Station					
	Alternative A		Total		\$0	
	No new costs - contract has been awarded			1	\$0	
	Alternative B		Total		\$0	
	No new costs - contract has been awarded			1	\$0	
	Alternative C		Total		\$0	
	No new costs - contract has been awarded			1	\$0	
8	NPS Maintenance Area					
	Alternative A		Total		\$0	
	No cost associated with this alternative			1	\$0	
	Alternative B		Total		\$995,000	
	Site Development - Site Renovation for Laboratory	LS	\$75,000	1	\$75,000	Cost includes assumption of 1000SF renovated for Water Laboratory, and associated requirements at \$75 S.F.
	Site Development - Site Renovation of Lower Warehouse	LS	\$300,000	1	\$300,000	Cost includes the demolition of existing interior of Lower Warehouse and renovation of storage spaces and associated requirements, for 4000 S.F at \$75 per square foot.
	Site Development - Site Construction for additional equipment and NPS Boat Storage	LS	\$20,000	1	\$20,000	Includes costs for 3000 SF of pavement, associated earthworks and lighting.
	Site Development - Building Improvements	LS	\$50,000	1	\$50,000	Includes costs for the application of stucco to 14000 SF of surface to improve appearances of maintenance structures.
	Site Development - Screening improvements	LS	\$460,000	1	\$460,000	Includes costs for 8ft height screen wall around Maintenance Area, assumed 2000 LF at cost of \$240.00 L.F.
	Site Development - Native Landscape enhancements	LS	\$90,000	1	\$90,000	Includes costs for native planting including trees, grasses and shrubs, and irrigation.
	Alternative C		Total		\$995,000	
	Site Development - Site Renovation for Laboratory	LS	\$75,000	1	\$75,000	Cost includes assumption of 1000SF renovated for Water Laboratory, and associated requirements at \$75 S.F.
	Site Development - Site Renovation of Lower Warehouse	LS	\$300,000	1	\$300,000	Cost includes the demolition of existing interior of Lower Warehouse and renovation of storage spaces and associated requirements, for 4000 S.F at \$75 per square foot.
	Site Development - Site Construction for additional equipment and NPS Boat Storage	LS	\$20,000	1	\$20,000	Includes costs for 3000 SF of pavement, associated earthworks and lighting.
	Site Development - Building Improvements	LS	\$50,000	1	\$50,000	Includes costs for the application of stucco to 14000 SF of surface to improve appearances of maintenance structures.
	Site Development - Screening improvements	LS	\$460,000	1	\$460,000	Includes costs for 8ft height screen wall around Maintenance Area, assumed 2000 LF at cost of \$240.00 L.F.
	Site Development - Native Landscape enhancements	LS	\$90,000	1	\$90,000	Includes costs for native planting including trees, grasses and shrubs, and irrigation.

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NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
9	Bicycle Trail					
	Alternative A		Total		\$0	
	No cost associated with this alternative			1	\$0	
	Alternative B		Total		\$683,000	
	Site Development - Site Preparation	LS	\$25,000	1	\$25,000	Cost includes assumption for clear and grub for path alignment and associated earthworks.
	Site Development - Concrete Bike Path	LS	\$570,000	1	\$570,000	Cost includes 4.5 mile concrete bike path, eight feet in width, 190 000 S.F. of concrete \$3 S.F.
	Site Development - Road Barrier	LS	\$60,000	1	\$60,000	Assumed 5000 LF of road barrier at \$12 L.F. to separate bikeway from road where it adjoins
	Site Development - Drainage	LS	\$20,000	1	\$20,000	Includes costs for culverts and drainage requirements
	Site Development - Bikeway Rehabilitation	LS	\$8,000	1	\$8,000	Includes costs for the application of hydroseeding of native grass seed mixes to disturbed areas of bikeway.
	Alternative C		Total		\$683,000	
	Site Development - Site Preparation	LS	\$25,000	1	\$25,000	Cost includes assumption for clear and grub for path alignment and associated earthworks.
	Site Development - Concrete Bike Path	LS	\$570,000	1	\$570,000	Cost includes 4.5 mile concrete bike path, eight feet in width, 190 000 S.F. of concrete \$3 S.F.
	Site Development - Road Barrier	LS	\$60,000	1	\$60,000	Assumed 5000 LF of road barrier at \$12 L.F. to separate bikeway from road where it adjoins
	Site Development - Drainage	LS	\$20,000	1	\$20,000	Includes costs for culverts and drainage requirements
	Site Development - Bikeway Rehabilitation	LS	\$8,000	1	\$8,000	Includes costs for the application of hydroseeding of native grass seed mixes to disturbed areas of bikeway.
10	Recreational Vehicle Park					
	Alternative A		Total		\$0	
	No cost associated with this alternative			1	\$0	Demolition & site rehabilitation included in 1. Concessionaire Housing
	Alternative B		Total		\$0	
	No cost associated with this alternative			1	\$0	Demolition & site rehabilitation included in 1. Concessionaire Housing
	Alternative C		Total		\$0	
	No cost associated with this alternative			1	\$0	Demolition & site rehabilitation included in 1. Concessionaire Housing

NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
11	Lake Powell Motel					
	Alternative A		Total		\$0	
	No cost associated with this alternative			1	\$0	
	Alternative B		Total		\$52,000	
	Site Acquisition - Purchase of Lake Powell Motel	LS	\$0	1	\$0	Purchase price in accordance with Wahweap Prospectus
	Site Demolition	LS	\$30,000	1	\$30,000	Cost includes demolition and removal of Motel.
	Site Rehabilitation	LS	\$22,000	1	\$22,000	Cost includes hydroseeding, native planting, and earthworks to rehabilitate the site for two acres.
	Alternative C		Total		\$52,000	
	Site Acquisition - Purchase of Lake Powell Motel	LS	\$0	1	\$0	Purchase price in accordance with Wahweap Prospectus
	Site Demolition	LS	\$30,000	1	\$30,000	Cost includes demolition and removal of Motel.
	Site Rehabilitation	LS	\$22,000	1	\$22,000	Cost includes hydroseeding, native planting, and earthworks to rehabilitate the site for two acres.
12	Wahweap Lodge					
	Alternative A		Total		\$300,000	
	Remodel Lodge to meet fire code requirements	LS	\$300,000	1	\$300,000	Cost is for the complete remodel of the lodge to ensure it meets fire code requirements.
	Alternative B		Total		\$735,000	
	Remodel Lodge to meet fire code requirements	LS	\$300,000	1	\$300,000	Cost is for the complete remodel of the lodge to ensure it meets fire code requirements.
	Site Modifications - Drop off area and improves access	LS	\$60,000	1	\$60,000	Cost assumes 21,000 S.F. of new pavement and landscaping for new drop off area.
	Site Development - Meeting Room Modifications	LS	\$375,000	1	\$375,000	Cost includes demolition of existing meeting rooms and remodel to create new meeting spaces. Assumed 7500 S.F. at \$50 S.F.
	Alternative C		Total		\$2,960,000	
	Remodel Lodge to meet fire code requirements	LS	\$300,000	1	\$300,000	Cost is for the complete remodel of the lodge to ensure it meets fire code requirements.
	Site Modifications - Drop off area and improves access	LS	\$60,000	1	\$60,000	Cost assumes 21,000 S.F. of new pavement and landscaping for new drop off area.
	Site Development - Meeting Room Modifications	LS	\$1,350,000	1	\$1,350,000	Cost includes demolition of interior of existing meeting rooms and remodel.
	Site Development - Additional Lodge Rooms	LS	\$1,250,000	1	\$1,250,000	25 new rooms at \$50,000.00 per room
13	Service Station					
	Alternative A		Total		\$0	
	No costs associated with this alternative.	LS		1	\$0	
	Alternative B		Total		\$230,000	
	Site Modifications - Remodel Service Station for commercial facility	LS	\$230,000	1	\$230,000	Modifications of 2000 S.F. of existing service station to commercial facility assumed \$115 S.F.
	Alternative C		Total		\$420,000	
	Site Modifications - Remodel Service Station for commercial facility	LS	\$230,000	1	\$230,000	Modifications of 2000 S.F. of existing service station to commercial facility assumed \$115 S.F.
	Site Development - Boat Cleaning Station	LS	\$190,000	1	\$190,000	Cost includes new 68'x31' boat cleaning station with apertures.

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NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
14	Fish Cleaning Station					
	Alternative A		Total		\$0	
	No costs associated with this alternative.	LS	\$0	1	\$0	
	Alternative B		Total		\$0	
	No costs associated with this alternative	LS	\$0	1	\$0	
	Alternative C		Total		\$75,000	
	Site Modifications - Upgrade to existing facility	LS	\$75,000	1	\$75,000	Cost includes refurbishment of counters, shade structure, upgrade grinder unit, upgrade to lighting.
15	Dry Boat Storage					
	Alternative A		Total		\$130,000	
	Site Development - Screening - Earth Mounding	LS	\$25,000	1	\$25,000	Cost assumes 4' earth mound 32' wide at \$8 C.Y.
	Site Development - Screening - Vegetation	LS	\$15,000	1	\$15,000	Cost includes hydroseeding and shrub planting.
	Site Development - Improve Lighting	LS	\$90,000	1	\$90,000	Cost includes 32 new light at \$2800 per light.
	Alternative B		Total		\$270,000	
	Site Development - Screening - Earth Mounding	LS	\$35,000	1	\$35,000	Cost assumes 4' earth mound 32' wide at \$8 C.Y.
	Site Development - Screening - Vegetation	LS	\$25,000	1	\$25,000	Cost includes hydroseeding and shrub planting.
	Site Development - Improve Lighting	LS	\$90,000	1	\$90,000	Cost includes 32 new light at \$2800 per light.
	Site Development - New visitor entrance and parking area	LS	\$120,000	1	\$120,000	Includes costs to construct new visitor access and parking area for dry boat storage. Assumed 50,000 S.F. asphalt for new parking area and entrance drive, new electrical distribution, lighting and associated earthworks.
	Alternative C		Total		\$848,000	
	Site Development - Screen Wall	LS	\$540,000	1	\$540,000	Cost includes the construction of 10' high screen wall, stucco and colored.
	Site Development - Screening - Vegetation	LS	\$25,000	1	\$25,000	Cost includes hydroseeding and shrub planting.
	Site Development - Site Construction	LS	\$185,000	1	\$185,000	Cost includes converting existing parking area for Dry Boat Storage (\$1000 per acre), lighting (32 lights @ \$2800), contact kiosk (\$85,000)
	Site Demolition - Existing Dry Boat Storage Area	LS	\$10,000	1	\$10,000	Cost includes the removal of all operational items and surface treatments from existing site.
	Site Rehabilitation - Existing Storage Area	LS	\$88,000	1	\$88,000	Cost includes all earthworks, hydroseeding and planting of native species to rehabilitate the 8 acre existing site.
16	Construction Area					
	Alternative A		Total		\$20,000	
	Site Development - Screening - Earth Mounding	LS	\$12,000	1	\$12,000	Cost assumes 4' earth mound 32' wide at \$8 C.Y.
	Site Development - Screening - Vegetation	LS	\$8,000	1	\$8,000	Cost includes hydroseeding and shrub planting.
	Alternative B		Total		\$152,000	
	Site Development - Screening - Earth Mounding	LS	\$15,000	1	\$15,000	Cost assumes 4' earth mound 32' wide at \$8 C.Y.
	Site Development - Screening - Vegetation	LS	\$10,000	1	\$10,000	Cost includes hydroseeding and shrub planting.
	Site Development - Site construction	LS	\$50,000	1	\$50,000	Costs allows for the construction of new access for staff, gravel surface, and associated earthworks.
	Site Rehabilitation - Existing Construction Area	LS	\$77,000	1	\$77,000	Cost includes all earthworks, hydroseeding and planting of native species to rehabilitate the 7 acre existing site.

NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
	Alternative C		Total		\$172,000	
	Site Development - Screening - Earth Mounding	LS	\$15,000	1	\$15,000	Cost assumes 4' earth mound 32' wide at \$8 C.Y.
	Site Development - Screening - Vegetation	LS	\$10,000	1	\$10,000	Cost includes hydroseeding and shrub planting.
	Site Development - Building Relocation	LS	\$20,000	1	\$20,000	Costs allows for the removal and relocating building within 1000' of existing location, and new concrete pad.
	Site Development - Site construction	LS	\$50,000	1	\$50,000	Costs allows for the construction of new access for staff, gravel surface, and associated earthworks.
	Site Rehabilitation - Existing Construction Area	LS	\$77,000	1	\$77,000	Cost includes all earthworks, hydroseeding and planting of native species to rehabilitate the 7 acre existing site.
17	Commercial Laundry Facility					
	Alternative A		Total		\$0	
	No costs associated with this alternative.	LS	\$0	1	\$0	
	Alternative B		Total		\$0	
	Relocate outside NRA	LS	\$0	1	\$0	Refer to Chapter 2 for description.
	Alternative C		Total		\$0	
	Relocate outside NRA	LS	\$0	1	\$0	Refer to Chapter 2 for description.
18	NPS Storage Yard					
	Alternative A		Total		\$0	
	No costs associated with this alternative.	LS	\$0	1	\$0	
	Alternative B		Total		\$75,000	
	Site Development - Perimeter Screening	LS	\$75,000	1	\$75,000	Cost includes earth berming, fence improvements and native landscaping.
	Alternative C		Total		\$75,000	
	Site Development - Perimeter Screening	LS	\$75,000	1	\$75,000	Cost includes earth berming, fence improvements and native landscaping.
19	Food Service Facility					
	Alternative A		Total		\$0	
	No cost associated with this alternative.	LS	\$0	1	\$0	
	Alternative B		Total		\$0	
	No cost associated with this alternative.	LS	\$0	1	\$0	
	Alternative C		Total		\$150,000	
	Site development - Food Services	LS	\$150,000	1	\$150,000	Possible food services range from mobile kiosks to established permanent restaurant which would put costs in the range of \$150 000.00 - \$1.5 million. Further study is required for detailed costs.
20	Recycling Transfer Station					
	Alternative A		Total		\$0	
	No cost associated with this alternative.	LS	\$0	1	\$0	
	Alternative B		Total		\$0	
	Provide facility outside NRA	LS	\$0	1	\$0	This alternative will require partnership with an outside operator for removal of recyclable materials from the NRA.
	Alternative C		Total		\$200,000	
	Site development - Recycling Transfer Station	LS	\$200,000	1	\$200,000	Cost for minimum site development for staging & consolidating for transport recycling material only.

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NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
WATER BASED FACILITIES						
21	Boat Ramps					
	Alternative A		Total		\$0	
	No cost associated with this option. Currently under construction.	LS	\$0	1	\$0	
	Alternative B		Total		\$100,000	
	Site development - Extend boat ramps	LS	\$100,000	1	\$100,000	Costs include extending existing ramps 30', with 10,000 S.F. of concrete expansion total.
	Alternative C		Total		\$110,000	
	Site development - Extend boat ramps	LS	\$100,000	1	\$100,000	Costs include extending existing ramps 30', with 10,000 S.F. of concrete expansion total.
	Site development - Staging Area	LS	\$10,000	1	\$10,000	Costs includes new staging area 3 x 65' slips.
22	Docks					
	Alternative A		Total		\$0	
	No cost associated with this alternative.	LS	\$0	1	\$0	
	Alternative B		Total		\$220,000	
	Site development - Improve Fuel Docks	LS	\$220,000	1	\$220,000	Costs include expansion for 3 new pumps and 2200 S.F. of docks.
	Alternative C		Total		\$491,000	
	Site Modification - Upgrade to Fuel Docks	LS	\$161,000	1	\$161,000	Costs includes provision for three gas pumps, 100 L.F. of fuel piping, and allowance for controls, with 2000 SF of additional dock area.
	Site development - Improve Fuel Docks	LS	\$220,000	1	\$220,000	Costs include expansion for 3 new pumps and 2200 S.F. of docks.
	Site Development - Provide courtesy docks for staging of commercial boats	LS	\$110,000	1	\$110,000	Include costs for two 80' courtesy docks and two gangways with anchoring system.
23	Marina					
	Alternative A		Total		\$0	
	No cost associated with this alternative.	LS	\$0	1	\$0	
	Alternative B		Total		\$1,660,000	
	Site Modification - Replace Overnight Slips	LS	\$540,000	1	\$540,000	Refer to Chapter 2 for description.
	Site Development - New Slips	LS	\$800,000	1	\$800,000	Refer to Chapter 2 for description.
	Site Development - Accessible Walk	LS	\$70,000	1	\$70,000	Costs includes for the provision of an accessible route from the existing parking areas to high water line of 3675.
	Site Development - Marina Store Modifications	LS	\$250,000	1	\$250,000	Refer to Chapter 2 for description.
	Alternative C		Total		\$1,678,000	
	Site Modification - Replace Overnight Slips	LS	\$540,000	1	\$540,000	Refer to Chapter 2 for description.
	Site Development - New Slips	LS	\$800,000	1	\$800,000	Refer to Chapter 2 for description.
	Site Development - Accessible Walk	LS	\$70,000	1	\$70,000	Costs includes for the provision of an accessible route from the existing parking areas to high water line of 3675.
	Site Development - Marina Store Modifications	LS	\$250,000	1	\$250,000	Costs includes expansion or modification of Marina Store to provide office space and food service facilities.
	Site Development - Shuttle Bus Signage	LS	\$18,000	1	\$18,000	Cost includes all signage necessary to operate a shuttle system during peak times from the Marina, Boat Ramps and parking area.

NUMBER	ITEM	UNIT	UNIT COST	QTY	EXTENDED COST	NOTES AND/OR ASSUMPTIONS
24	Houseboat Rentals					
	Alternative A		Total		\$0	
	Site Development - Increase PWC from 20 to 35	LS	\$0	1	\$0	No Costs, Incorporated into exec slips and existing marina.
	Alternative B		Total		\$0	
	Site Development - Increase PWC from 20 to 35	LS	\$0	1	\$0	No Costs, Incorporated into exec slips and existing marina.
	Alternative C		Total		\$0	
	Site Development - Increase PWC from 20 to 35	LS	\$0	1	\$0	No Costs, Incorporated into exec slips and existing marina.
25	Tour Boats					
	Alternative A		Total		\$0	
	No cost associated with this alternative.	LS	\$0	1	\$0	No Costs, Incorporated into exec slips and existing marina.
	Alternative B		Total		\$0	
	No cost associated with this alternative.	LS	\$0	1	\$0	No Costs, Incorporated into exec slips and existing marina.
	Alternative C		Total		\$85,000	
	Site Development - Tour Boat Shelter	LS	\$85,000	1	\$85,000	Cost assumed the construction of a Tour Boat Staging area shade structure, benches and sidewalk, with seating.
GRAND TOTALS						
	Alternative A		Total		\$800,000	
	Concept Plan Contingency	25%			\$200,000	
	Contractors General Conditions, Profit, Bonds and Overhead	12%			\$96,000	
	Subtotal				\$1,096,000	
	Architecture and Engineering Fees Allowance	20%			\$219,200	Allowance for Planning and Design Fees
	Owners Construction Contingency	5%			\$54,800	
	TOTAL				\$1,370,000	
	Alternative B		Total		\$19,153,000	
	Concept Plan Contingency	25%			\$4,788,250	
	Contractors General Conditions, Profit, Bonds and Overhead	12%			\$2,298,360	
	Subtotal				\$26,239,610	
	Architecture and Engineering Fees Allowance	20%			\$5,247,922	Allowance for Planning and Design Fees
	Owners Construction Contingency	5%			\$1,311,981	
	TOTAL				\$32,799,513	
	Alternative C		Total		\$29,148,000	
	Concept Plan Contingency	25%			\$7,287,000	
	Contractors General Conditions, Profit, Bonds and Overhead	12%			\$3,497,760	
	Subtotal				\$39,932,760	
	Architecture and Engineering Fees Allowance	20%			\$7,986,552	Allowance for Planning and Design Fees
	Owners Construction Contingency	5%			\$1,996,638	
	TOTAL				\$49,915,950	

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Appendix D – Species List

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Federally threatened, endangered, and candidate plant and animal species and plant species with conservation agreements with potential to occur in Coconino County, Arizona.

Common Name	Scientific Name	Status	Description	County	Elevation Range	Habitat	Comments
Apache (Arizona) trout	<i>Oncorhynchus apache</i>	Threatened	This yellowish or yellow-olive cutthroat-like trout has large dark spots on body. Its dorsal, anal, and caudal fins are edged with white. It has no red lateral band.	Apache Coconino Gila Graham Greenlee Navajo	>5000 ft	Presently restricted to cold mountain streams with many low gradient meadow reaches.	Occupies stream habitats with substrates of boulders, rocks, and gravel with some sand or silt through mixed conifer and spruce-fir forests, and montane meadows and grasslands in the White Mountains. Also managed as a sport fish under special regulations. Found in North Canyon on East side of Kaibab Plateau.
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Large, adults have white head and tail. Height 28-38"; wingspan 66-96". 1-4 yrs dark with varying degrees of mottled brown plumage. Feet bare of feathers.	Apache Cochise Coconino Gila Graham La Paz Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai Yuma	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Some birds are nesting residents while a larger number winters along rivers and reservoirs. An estimated 200 to 300 birds winter in Arizona. Once endangered (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) because of reproductive failures from pesticide poisoning and loss of habitat, this species was down listed to threatened on August 11, 1995. Illegal shooting, disturbance, and loss of habitat continues to be a problem. Species has been proposed for delisting (64 FR 36454) but still receives full protection under the ESA.

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Black-footed ferret	<i>Mustela nigripes</i>	Endangered	Weasel-like, yellow buff coloration with black feet, tail tip, and eye mask. It has a blunt light colored nose and is 15-18 inches long and tail length is 5-6 inches.	Apache Coconino Navajo	<10,500	Grassland plains generally found in association with prairie dogs.	Unsurveyed prairie dog towns may be occupied by ferrets or may be appropriate for future reintroduction efforts. The Service developed guidelines for surveying prairie dog towns which are available upon request. No wild populations of this species are currently known to exist in Arizona.
Brady pincushion cactus	<i>Pediocactus bradyi</i>	Endangered	Small, semi-globose cactus, 2.4 inches tall and 2 inches in diameter. Spines are white or yellowish-tan. The spine clusters 1-2 central spines and 14-15 spreading radial spines. Flower: straw yellow produced at top of the stem.	Coconino	3850-4500 ft	Benches and terraces in Navajo desert near Marble Gorge.	Substrate is Kaibab limestone chips over Moenkopi shale and sandstone soil. Plant community dominated by shadscale (<i>Atriplex confertifolia</i>), snakeweed (<i>Gutierrezia sarothrae</i>), Mormon tea (<i>Ephedra viridis</i>), and desert trumpet (<i>Eriogonum inflatum</i>). Protected by CITES and Arizona Native Plant Law.
California Brown pelican	<i>Pelecanus occidentalis californicus</i>	Endangered	Large dark gray-brown water bird with a pouch underneath long bill and webbed feet. Adults have a white head and neck, brownish black breast, and silver gray upper parts.	Apache Cochise Coconino Gila Graham Greenlee La Paz Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai Yuma	Varies	Coastal land and islands; species found around many Arizona lakes and rivers	Subspecies is found on Pacific Coast and is endangered due to pesticides. It is an uncommon transient in Arizona on many Arizona lakes and rivers. Individuals wander up from Mexico in summer and fall. No breeding records in Arizona.

California condor	<i>Gymnogyps californianus</i>	Endangered	Very large vulture (47 in., wingspan to 9 1/2 ft, weight to 22 lbs); adult plumage blackish, immature more brownish; adult wing linings white, immature mottled; head and upper parts of neck bare; yellow-orange in adults, grayish in mature.	Apache Coconino Mohave Navajo	Varies	High desert canyonlands and plateaus	Last wild condor reported in Arizona in 1924. Recovery program has reintroduced condors to Northern Arizona, with the first release (6 birds) in December 1996. Release site located at the Vermillion Cliffs (Coconino County), with an experimental/nonessential area designated for most of Northern Arizona and Southern Utah. Experimental/nonessential area in Arizona is within a polygon formed by Hwy 191, Interstate 40, and Hwy 93, and extends north of the Arizona-Utah and Nevada borders.
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	Threatened	Cream colored tubercles (spots) on a dark background on the rear of the thigh, dorsolateral folds that are interrupted and deflected medially, and a call given out of water distinguish this spotted frog from other leopard frogs.	Apache Cochise Coconino Gila Graham Greenlee Navajo Pima Santa Cruz Yavapai	3300-8900 ft	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs	Require permanent or nearly permanent water sources. Populations north of the Gila River may be closely-related, but distinct, undescribed species. A special rule allows take of frogs due to operation and maintenance of livestock tanks on State and private lands.
Humpback chub	<i>Gila cypha</i>	Endangered	Large (18 inches) minnow flattened head long fleshy snout, large fins, and a very large hump between the head and the dorsal fin.	Coconino Mohave	< 4,000 ft	Large warm turbid rivers especially canyon areas with deep fast water.	Critical habitat in Grand Canyon.

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Kanab ambersnail	<i>Oxyloma haydeni kanabensis</i>	Endangered	Small 14-19 mm (<0.7 inch), light amber color, sometimes grayish-amber mottled; right handed shell.	Coconino	2,900 ft	Travertine seeps and springs in Grand Canyon National Park	Extremely geographically isolated. Three historic populations; two remaining; one on private property in Utah and one in Grand Canyon National Park; species affected by operations by Glen Canyon Dam. Associated with watercress, monkey flower, and other wetland vegetation.
Little Colorado spinedace	<i>Lepidomeda vittata</i>	Threatened	Small (<4 inches long) silvery minnow which is darker on the back than the belly.	Apache Coconino Navajo	4000-8000 ft	Moderate to small streams in pools and riffles with water flowing over gravel and silt.	Critical habitat includes eighteen miles of East Clear Creek, eight miles of Chevelon Creek, and five miles of Nutrioso Creek.
Mexican gray wolf	<i>Canis lupus baileyi</i>	Endangered	Large dog-like carnivore with varying color, but usually a shade of gray. Distinct white lip line around mouth. Weigh 60-90 pounds.	Apache Cochise Coconino Greenlee Pima Santa Cruz	4,000 - 12,000 ft	Chapparal, woodland, and forested areas. May cross desert areas.	Historic range is considered to be larger than the counties listed above. Unconfirmed reports of individuals in the southern part of the state (Cochise, Pima, Santa Cruz) continue to be received. Individuals may still persist in Mexico. Experimental nonessential population introduced in the Blue Primitive Area of Greenlee, Apache, and Coconino counties.
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache Cochise Coconino Gila Graham Greenlee Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai	4100-9000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nests in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was removed in 1998 but re-proposed in July 2000 and finalized in February 2001 for Apache, Cochise, Coconino, Graham, Mohave, Pima counties; Also in New Mexico, Utah, and Colorado.

Navajo sedge	<i>Carex specuicola</i>	Threatened	Perennial forb with triangular stems, elongated rhizomes. Flower: white June and July.	Apache Coconino Navajo	5700-6000 ft	Silty soils at shady seeps and springs.	Designated critical habitat is on the Navajo Nation near Inscription House Ruins. Found at seep springs on vertical cliffs of pink-red Navajo sandstone.
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered	Large (up to 3 feet long and up to 6 lbs, high sharp-edged keel-like hump behind the head. Head flattened on top. Olive-brown above to yellowish below.	Coconino Gila Graham Greenlee La Paz Maricopa Mohave Pinal Yavapai Yuma	< 6000 ft	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.	Species is also found in Horseshoe reservoir (Maricopa County). Critical habitat includes the 100-year floodplain of the river through the Grand Canyon from confluence with Paria River to Hoover Dam; Hoover Dam to Davis Dam; Parker Dam to Imperial Dam. Also Gila River from Arizona/New Mexico border to Coolidge Dam; and Salt River from Hwy 60/SR77 Bridge to Roosevelt Dam; Verde River from FS boundary to Horseshoe Lake.
San Francisco Peaks groundsels	<i>Senecio franciscanus</i>	Threatened	Member of sunflower family, dwarf alpine species 1.2-4 inches tall. Leaves deeply lobed. Flowers: 0.5 inch diameter 1-6 yellow-gold flowers.	Coconino	10900+ ft	Alpine tundra	Designated critical habitat is San Francisco Peaks. Found above spruce-fir and pine forests on talus slopes.
Sentry milk vetch	<i>Astragalus cremnophylax</i> var. <i>cremnophylax</i>	Endangered	< 1 inch high forming a mat 1-10 inches in diameter. Flowers: pale purple April to May.	Coconino	>4,000 ft	Pinyon-juniper-cliffrose on a white layer of limestone.	Grows on Kaibab limestone with little soil in an unshaded opening in pinyon-juniper. Possibly more populations to be found on south rim of Grand Canyon and east rim of Marble Gorge.
Siler pincushion cactus	<i>Pediocactus sileri</i>	Threatened	Small solitary or clustered cactus globose shaped about 5 inches tall and 3-4 inches in diameter. Flowers: yellow with maroon veins.	Coconino Mohave	2,800-5,400 ft	Desertscrub transitional areas of Navajo, sagebrush and Mohave Deserts	Grows on gypsiferous clay and sandy soils of moenkopi formation.

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Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache Cochise Coconino Gila Graham Greenlee La Paz Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai Yuma	<8500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Migratory riparian obligate species that occupies breeding habitat from late April to September. Distribution within its range is restricted to riparian corridors. Difficult to distinguish from other members of the Empidonax complex by sight alone. Training seminar required for those conducting flycatcher surveys. Critical habitat was set aside by the 10th Circuit Court of Appeals (May 17, 2001).
Welsh's milkweed	<i>Asclepias welshii</i>	Threatened	Milkweed family (Asclepiadaceae), rhizomatous, herbaceous perennial, 10-40 inches tall with large oval leaves. Flowers: cream colored, rose tinged in center.	Coconino	VARIES	Open stabilized desertscrub dunes and lee side of active dunes.	Designated critical habitat is in Utah.
Gila chub	<i>Gila intermedia</i>	Proposed Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise Coconino Gila Graham Greenlee Maricopa Pima Pinal Santa Cruz Yavapai	2000 - 3500 ft	Pools, springs, cienegas, and streams.	Multiple private landowners, including the Nature Conservancy, the Audubon Society, and others. Also Fort Huachuca. Species also found in Sonora, Mexico. Proposed critical habitat occurs in Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz and Yavapai counties.

Fickeisen plains cactus	<i>Pediocactus peeblesianus</i> var. <i>fickeiseniae</i>	Candidate	Very small (3 inches tall - 1.5 inches diameter) unbranched cactus that retreats into gravelly soils after flowering and fruiting. Tubercles form a spiral pattern around plant. Central spine 3/8 inch long flowers cream/yellow.	Coconino Mohave	4,000-5,000 ft	Exposed layers of Kaibab limestone on canyon margins or hills of Navajoan Desert.	
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Candidate	Medium sized bird with a slender, long-tailed profile, slightly down-curved bill, which is blue-black with yellow on the lower half of the bill. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache Cochise Coconino Gila Graham Greenlee La Paz Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai Yuma	< 6,500 ft	Large blocks of riparian woodlands (Cottonwood, willow, or tamarisk galleries).	Species was found warranted, but precluded for listing as a distinct vertebrate population segment in the western U.S. on July 25, 2001. This finding indicates that the Service has sufficient information to list the bird, but other, higher priority listing actions prevent the Service from addressing the listing of the cuckoo at this time.
Arizona bugbane	<i>Cimicifuga arizonica</i>	Conservation Agreement	Perennial herb in the buttercup family up to 6-7 feet tall. Small white petal-less flowers appear in July-August. Fruit a follicle that splits open on one side as it dries.	Coconino Gila	5,300-7,000 ft	Moist, loamy soil between coniferous and riparian ecotones.	Rich, fertile soils high in humus content, deep shade, and high humidity appears to be primary habitat requirements for this species. Conservation Agreement signed in June 1999.

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Paradine (Kaibab) plains cactus	<i>Pediocactus paradinei</i>	Conservation Agreement	Small, green, globose cactus; usually less than 40 mm tall with half of its stem underground. Plant diameters can reach 60-80 mm. 4-6 spines per areole; flowers are 19-25 mm with cream to pale yellow petals and pink midrib.	Coconino	>4,500 ft	Pinyon-juniper woodland, and shrub/grassland	Species also called Paradine Plains Cactus. Conservation Agreement between the Service, Kaibab National Forest, and the Bureau of Land Management finalized in October 1996; signed in February 1998.
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Apr-22-2003 03:38pm

From: GLEN CANYON XEROX ROOM

9286086259

T-204 P.002/003 F-563



United States Department of the Interior

U.S. Fish and Wildlife Service

Arizona Ecological Services Field Office

2321 West Royal Palm Road, Suite 103

Phoenix, Arizona 85021-4951

Telephone: (602) 242-0210 Fax: (602) 242-2513



In Reply Refer to:

AESO/SE

02-21-03-I-0146

February 24, 2003

Memorandum

To: Superintendent, Glen Canyon National Recreation Area, Page, Arizona
(Attn: WW DCP/EA)

From: Field Supervisor

Subject: WAHWEAP Development Concept Plan

Thank you for your recent request for information on threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may occur in your project area. The Arizona Ecological Service Field Office has posted lists of the endangered, threatened, proposed, and candidate species occurring in each of Arizona's 15 counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: <http://arizonaes.fws.gov>

If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find Arizona County/Species List on the main page. Then click on the county of interest. The arrows on the left will guide you through information on species that are listed, proposed, candidates, or have conservation agreements. Here you will find information on the species' status, a physical description, all counties where the species occurs, habitat, elevation, and some general comments. Additional information can be obtained by going back to the main page. On the left side of the screen, click on Document Library, then click on Documents by Species, then click on the name of the species of interest to obtain General Species Information, or other documents that may be available. Click on the cactus icon to view the desired document.

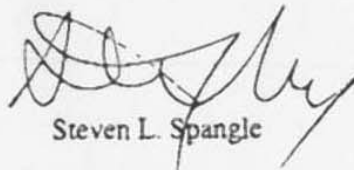
Please note that your project area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Under the General Species Information, citations for the Federal Register (FR) are included for each listed and proposed species. The FR is available at most public libraries. This information should assist you in determining which species may or may not occur within your project area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.

Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency will need to request formal consultation with us. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency will need to enter into a section 7 conference. The county list may also contain candidate species. Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, we recommend the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona and some of the Native American Tribes protect some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species, or contact the appropriate Native American Tribe to determine if sensitive species are protected by Tribal governments in your project area. We further recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your informal or formal Section 7 Consultation process.

For future projects, you do not need to contact our office to obtain a species list for a new project. However, for additional communications regarding this project, please refer to consultation number 02-21-03-I-0146. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Tom Gatz for projects in northern Arizona or along the Colorado River (x240) or Sherry Barrett for projects in southern Arizona.



Steven L. Spangle

cc: John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

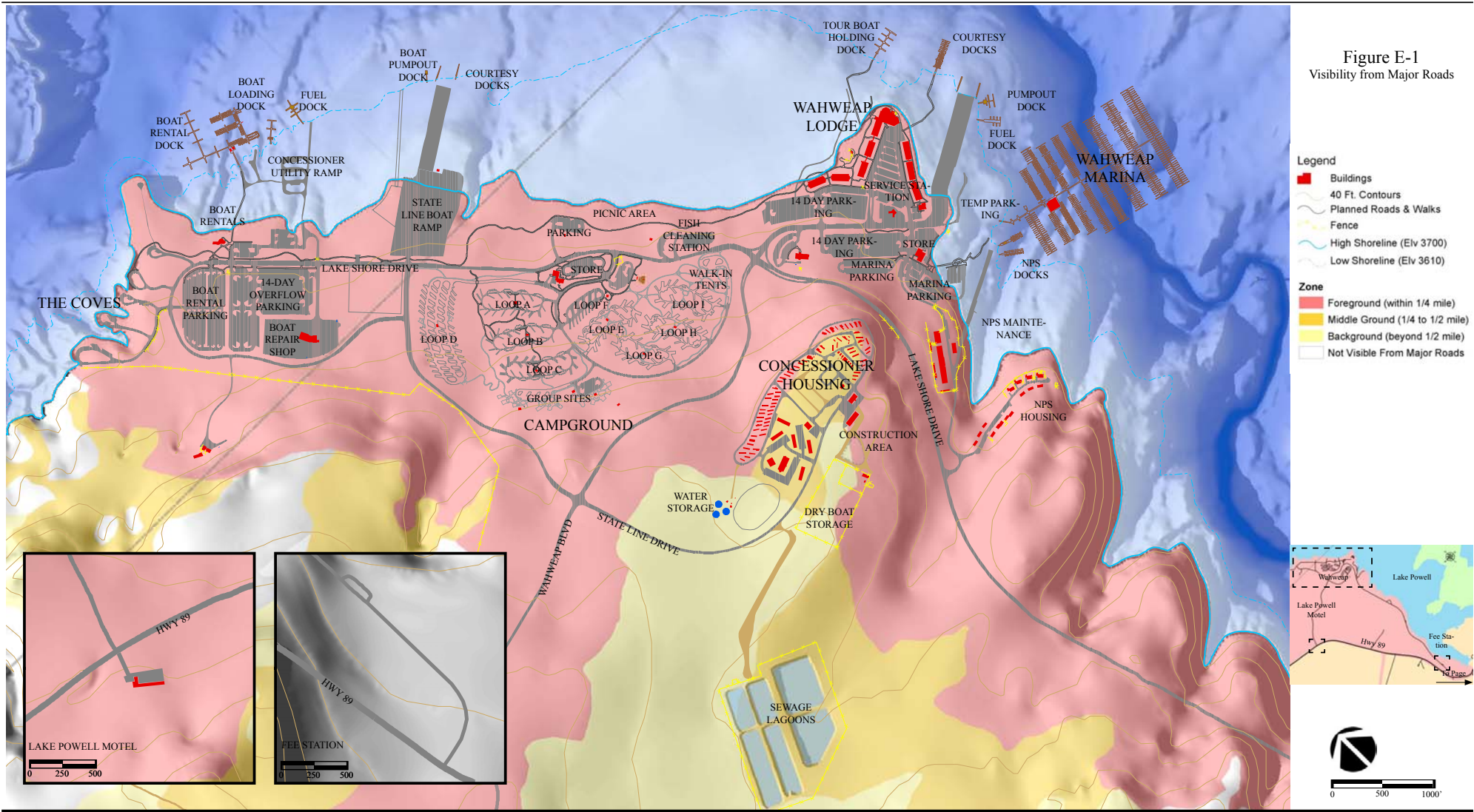
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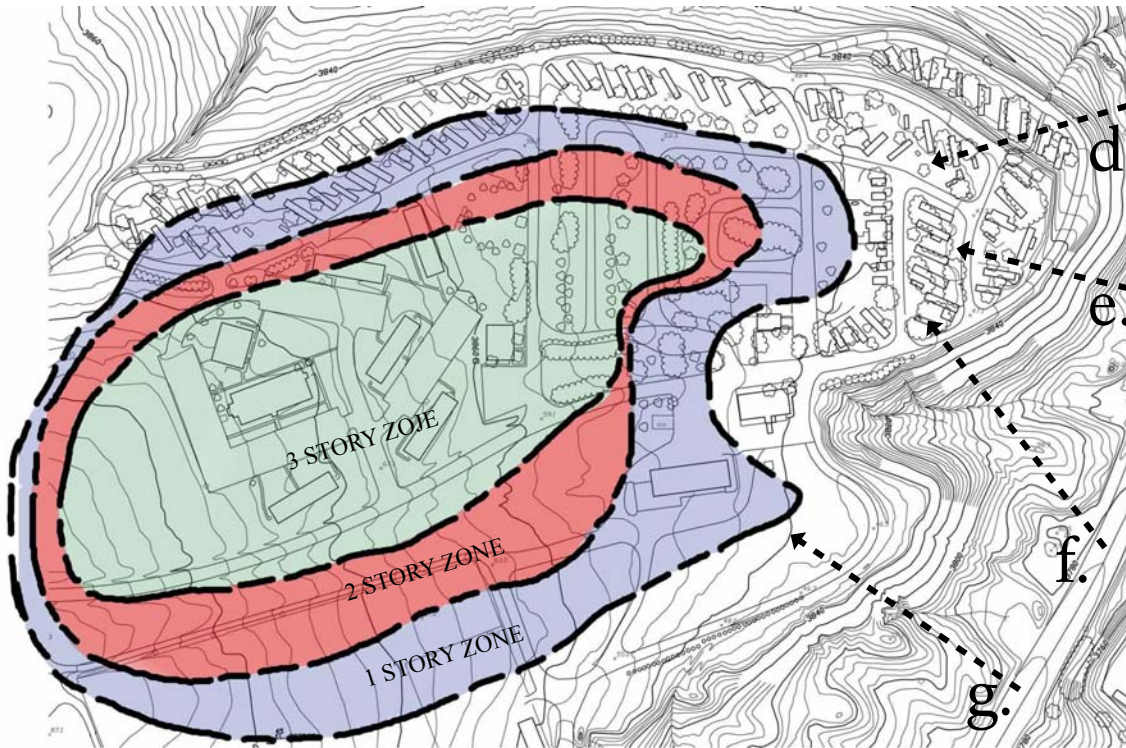
Appendix E – Visibility Analysis

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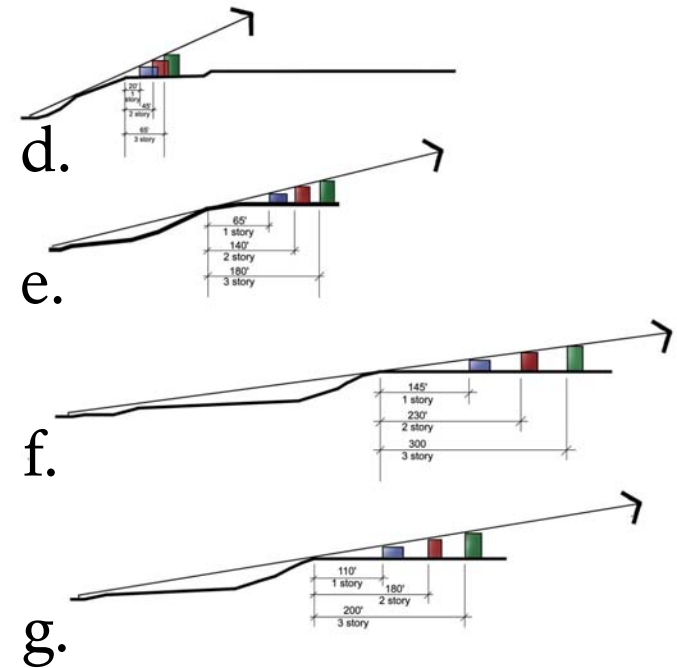
Figure E-1
Visibility from Major Roads





The building height boundaries were established by taking several sections along Lake Shore Drive (only 4 are shown for example purposes). These sections defined the areas in which one story, two story, and three story buildings can be seen from along the road entering Wahweap.

Figure E-2
Concessioner Housing
Visibility



Appendix F – Area Table

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Disturbed and Restored Areas

Number	Element	Alternative A No Action	Alternative B			Alternative C Preferred		
		Existing Conditions (acres)	Proposed Area (acres)	(+) Add. Disturbed Area (acres)	(-) Restored Area (acres)	Proposed Area (acres)	(+) Add. Disturbed Area (acres)	(-) Restored Area (acres)
1	Concessioner Housing	29.0	5.2	0	23.8	14.0	0	15.0
2	Cabins	1.0	0	0	1.0	1.0	0	0
3	Campground	97.0	97.0	0	0	97.0	0	0
4	Visitor Contact Station	0	3.8	3.8	0	0.0	0	0
5	Fee Station	0.8	0.8	0.0	0	1.0	0.2	0
6	Lake Powell Motel	1.3	0	0	1.3	0	0	1.3
7	Wahweap Lodge	3.9	3.9	0	0	0.4	0.4	0
8	Dry Boat Storage	8.0	8.0	0.0	0	8.0	0	1.5
9	Construction Area	6.5	6.5	0	0	6.5	0	0
10	Commercial Laundry Facility	0.5	0.5	0	0	0	0	0.5
11	Food Service Facility	0	0	0	0	2.6	2.6	0
12	Recycling Transfer Station	0	0	0	0	2.0	2.0	0
13	Launch Ramps	1.1	1.1	0.0	0	1.1	0.0	0
14	House Boat Loading Area	0.0	0.0	0.0	0	1.5	1.4	0
15	Accessible Trail	0	0	0	0	0.2	0.06	0
Total (acres)		149.1	126.8	3.8	26.1	135.3	6.7	18.3

Notes:

- 1) Only elements that are spatially reconfigured or modified are listed. If no change in spatial extent occurs than element is not listed.
- 2) Accessible trail will be built at a width of 5'-0". For this table a width of 11'-0" was used to account for grading disturbances. These are short term disturbances and will be restored.

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As the nation's principle conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in the island territories under U.S. administration.

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